GOVERNMENT OF INDIA
TARIFF COMMISSION

REPORT
ON
THE FAIR SELLING PRICES
OF
SYNTHETIC RUBBER

BOMBAY
1971

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STATEMENT LAID BY THE MINISTER OF PETROLEUM AND CHEMICALS ON THE TABLE OF LOK SABHA ON 27TH JULY, 1973 AND IN RAJYA SABHA ON THE 30TH JULY, 1973 UNDER SECTION 16(2) OF THE TARIFF COMMISSION ACT, 1951.

SUBJECT.—*Tariff Commission Report on the fair selling price of Synthetic Rubber—Reasons for delay.*

The Tariff Commission's recommendations on the fair selling price of Synthetic Rubber, was submitted on 28th August 1971 and was received in the Ministry of Petroleum and Chemicals on 23rd September, 1971. The Commission, inter-alia, made the following recommendations :—

(1) The fair ex-factory selling prices of the three main grades of SBR, namely, S-1500/1502, S-1712 and S-1958 to be valid upto 31st December 1973 are as under:—

Grade	*Method A*		*Method B*	
	Where Block value and Depreciation are calculated on written Down Value method		Where Block value and Depreciation are calculated on straight line Method	
	Rs. per tonne	Rs. per Kg.	Rs. per tonne	Rs. per Kg.
S-1500/1502 .	4,069.93	4.05	4,400.10	4.40
S-1712 .	3,646.47	3.65	3,887.04	3.90
S-1958 . .	4,037.20	4.05	4,367.37	4.40

(The prices statutorily fixed with effect from 16-12-69 and which are in force are as under :—

S-1500/1502 . . . Rs. 4,400 per tonne

S-1712 . . . . Rs. 3,900 per tonne

S-1958 . . . . Rs. 6,800 per tonne

(2) For the purpose of fair price calculations, the Commission have proceeded on the following main assumptions :—

(i) The average annual production during the price period would be 35,000 tonnes of SBR.

(ii) The full requirements of Alcohol for the manufacture of SBR would be met from indigenous sources at controlled prices.

(iii) Benzene requirements would be fully met by supplies from Hindustan Steel.

(iv) A part of the Butadiene requirements would be met by purchases from NOCIL.

(3) An additional sum of Rs. 19.63 lakhs per annum has been allowed towards special repairs and maintenance to enable the Company to optimise its plant utilisation.

2. The recommendations of the Tariff Commission were examined by the Ministry of Petroleum and Chemicals in consultation with the Ministries of Finance and Commerce; Planning Commission and DGTD and were also discussed at inter-departmental meetings from February 1972, to February 1973. In June 1972 the Ministry of Finance, Department of Economic Affairs raised certain important issues which had to be referred to the Tariff Commission for advice/comments. References had to be made to the Ministry of Finance (Cost Accounts Branch) for making fresh calculations of fair selling prices of synthetic rubber in the light of the points raised by the Ministry of Finance, Department of Economic Affairs. All this took time. Meanwhile in December 1972, before the Ministry of Petroleum and Chemicals could finalise the views on the recommendations of the Tariff Commission, the manufacturers represented to the Government that in view of the position that they would have to use imported alcohol, the cost of which was about three times of that of the indigenous alcohol and that there were substantial increases in other elements of cost, since the Tariff Commission had made the cost calculations, the Government should consider granting *ad-hoc* increase in price of various grades of synthetic rubber.

In view of the above, the whole matter had to be examined afresh in consultation with the Ministry of Law and other Ministries concerned. It would take some time before the final views on the recommendations of the Tariff Commission are formulated. The matter may have to be referred to the Tariff Commission again for revision in the light of the relevant factors affecting the cost of production and fair selling prices of synthetic rubber. Meanwhile interim price structure of synthetic rubber is under consideration and a decision in this regard is expected to be taken shortly.

3. Normally the practice is to lay the Report of the Tariff Commission on the Table of the House together with Government's decision on the recommendations contained in the Report. In the circumstances explained above there has been delay in taking decision; however, as there has been a demand in Parliament for the Report to be laid on the Table of the House, the Report is accordingly now being laid.

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PERSONNEL OF THE COMMISSION

SHRI B. N. BANERJI	*Chairman*
SHRI F. H. VALLIBHOY	*Member*
SHRI PRAMOD SINGH	*Member*

SECRETARY

DR. P. V. GUNISHASTRI

1—14 T.C. Bom./73

APPENDICES

REPORT ON THE FAIR SELLING PRICES OF SYNTHETIC RUBBER

1. Terms of reference

1.1. The Government of India in the Ministry of Foreign Trade by letter No. 20(2)-Tar/70, dated 25th April 1970, requested the Commission under Section 12(d) of the Tariff Commission Act, 1951, to undertake an enquiry into the fair prices of Synthetic Rubber produced by M/s Synthetics & Chemicals Ltd., Bareilly, and furnish its recommendations to Government as early as possible. The full text of Government's letter referred to above, is given in Appendix-I.

1.2 When the only Synthetic Rubber plant in the country went into production in 1963, its promotors, apprehending difficulties in the sale of their products, approached Government for special assistance in creating favourable market conditions for SBR. This became necessary especially because of the fact that its cost of production turned out to be much higher than was estimated by the Company while planning this scheme. There was also stiff competition from Natural Rubber as the average price of RMA—1 grade was then ruling at around Rs. 3.29 per kg. or 22 per cent below the quoted price of SBR of Rs. 4·23. Consequently, Government interceded and advised the major rubber consumers in the country (especially the Tyre Companies) to lift certain specific quantities of SBR. A link was also established between the offtake of allocated quantities of SBR and the imports by the user companies of their balance requirements of Natural and/or special purpose Synthetic Rubbers. As a corolary, the producer of SBR agreed to a voluntary price control of its products. The prices so fixed were being adjusted from time to time having regard to periodic variations in the cost of production of SBR.

1.3. In December 1969 the system of voluntary price fixation broke down, as the price proposed by Government at Rs. 4.03 per kg. of S-1500 grade SBR as effective from

8th June, 1969 was not acceptable to the producer. Consequently, a Statutory Control pending reference of the question of fixation of a fair price of the Company's products to the Tariff Commission was imposed with effect from 16th December 1969. The prices so fixed in respect of each of the varieties of SBR are as under :—

1. S-1500/S-1502 . . Rs. 4.40 per kg.
2. S-1712 (Oil Entended) Rs. 3.90 per kg.
3. S-1958 . . . Rs. 6.80 per kg.

These prices are operative even at present.

2. Scope of inquiry

2.1. *As about* 95 *per cent of the Company's total production of SBR comprises of grades S-*1500/*S-*1502, *S-*1712 *and S-*1958, *we have limited the scope of our current inquiry to these items alone.*

2.2. We have adopted the following abbreviations for the technical names mentioned against the following wherever they occur in this Report.

NR —for Natural Rubber.

SR —for all types of Synthetic Rubbers.

SBR—for Styrenes and Butadiene Rubber.

PBR—for Poly-Butadiene Rubber.

3. Method of Inquiry

3.1. Special questionnaires were issued to the sole producer of SBR, its consumers, namely, tyre and other rubber good manufacturers as well as to suppliers of raw materials, eliciting information on various aspects of the Inquiry concerning them. Memoranda covering detailed information on prices, quality, supply of and demand for SBR in the context of availability of other SRs such as PBR, Butyl, Neoprene as also NR were called for from the Indian Rubber Industries Association, Bombay and Assiciation of Rubber Manufacturers in India, Calcutta. The Ministry of Petroleum & Chemicals, and the Directorate General of Technical Development (DGTD) were requested to offer their detailed comments on the various aspects relating to the Industry under inquiry. Letters were also issued on certain

specific issues pertaining to supply and demand as well as quality and prices to various other Government Departments/Bodies. Simultaneously, a Press Note was released inviting all others interested in the Inquiry to obtain copies of the relevant questionnaires and furnish their replies. A list of those to whom questionnaires/letters were addressed and from whom replies or memoranda were received, is given in Appendix II.

3.2. Our Cost Accounts Division has carried out the cost investigation of M/s Synthetics & Chemicals Ltd., Bareilly. We also visited this unit as well as their Technical Service Laboratory, Bombay. Details of these visits are given in Appendix III.

3.3. A Public Inquiry was held on 4th May 1971. A list of persons who attended it is contained in Appendix IV. We also held detailed and intensive discussions in camera, with the representatives of the Company on the 2nd, 5th, 7th, 8th and 9th July, 1971. In the course of these discussions we examined along with them, in some depth, data relating to their actual costs as well as their estimates of future costs. Opportunity was also taken to ascertain their views in respect of the various other aspects which they would wish to be taken into account while making our recommendations.

3.4. In accordance with the restrictions on disclosure of information contained in the Tariff Commission Act, certain details of financial and cost information are being forwarded to Government as confidential enclosures (Annexures 1 to 11). *These are intended for Government's own information and not for publication.*

4. A brief Survey of developments in and prospects of Synthetic Rubbers.

4.1. **World Trends :**

4.1.1. Although the process of Synthesising a rubber like elastomer by the co-polymerisation of certain organic monomers like Styrene and Butadiene had been known for quite some time, the commercial production of SBR was a war-time development, especially in the U. S. A. The main motivation was to reduce dependence on imported supplies of

NR which was a strategic war material. Some of the earlier plants were based on Alcohol but fairly soon this important raw material was substituted by crude Naphtha, a Petro-Chemical by-product generated during the refinement of crude mineral oil. As SRs began to replace NR in various end products, a number of further developments in the production of specialised SRs for specified purposes also emerged. This process is continuing. Nevertheless, SBR which is a general purpose rubber still accounts for about two thirds of all SRs and a little less than half of all Rubbers (*Vide* Appendix V). Even in the U. S. A. which is one of the largest producers and consumers, both in absolute and proportionate terms, of SRs as a whole, it has been estimated that during 1970 against a total consumption of new rubbers approximating 2.5 million tonnes, dry SBR accounted for 55.5 per cent. The corresponding figures for NR and other forms of SRs were of the order of 22.3 and 22.2 per cent respectively.

TABLE NO. 4.1

U. S. A. Dry General purpose Rubber consumption

Year	Dry NR as per cent of total dry New Rubber	Dry SBR as per cent of total dry New Rubber	Dry Stereo per cent of total dry New Rubber
1964	28.4	61.8	9.8
1965	28.6	60.1	11.3
1966 . . .	28.4	58.8	12.8
1967 . . .	26.3	59.4	14.3
1968 . . .	26.5	58.1	15.4
1969 . .	26.5	55.2	18.3
1970 (estimated) . . .	22.3	55.5	22.2

Source:—International Institute of Synthetic Rubber Producer's Inc., 29th March—1st April 1971 'SRP Inc.)

4.1.2. Various Experts and Organisations have estimated that the future world consumption of SBR would by 1975, rise by 35 per cent to 2.7 million tons. However, its share in the total consumption of SRs would decrease from 72.3 per cent in 1965 (two-thirds in 1970) to 57.4 per cent due to expected increase in the consumption of poly-Butadiene and poly-Isoprene. The Table No. 4.2 gives the present capacity, percentage of growth requirement by 1980, with new capacity in currently producing and non-producing countries.

TABLE NO. 4.2

Development of Synthetic Rubber Capacity

('000 tons)

	North America (Region 1)	West Europe (Region 2)	Far East & Australia (Region 3)	Latin America Africa & others (Region 4)
(i) Present capacity .	2,900	1,600	730	390
(ii) 1980 growth required percentage of (i) . . .	33	63	168	112
(iii) New capacity required . .	950	1,000	1,230	430
(iv) New capacity in presently producing countries .	N.A.	N.A.	N.A.	300
(v) New capacity in presently non-producing countries.	N.A.	N.A.	N.A.	350/400
(vi) Total new capacity by 1980 . .	N.A.	N.A.	N.A.	650 to 700

Source : *Vide* Gorden Atkinson Study contained in International Institute of dynthefic Rubber Producers Inc. 29th March—1st April, 1971.

4.1.3. An estimate based on what has been presented in the above Table would suggest that some ten new plants each having a capacity of about 35,000 to 40,000 tons would be set up in the non-producing countries of Region 4 before 1980. If the other producing countries in this Region maintain the growth rate as visualised by Gorden Atkinson for these areas, their combined capacity would go up by some 3 lakh tons. Thus by 1980, the total installed capacity of this area would be of the order of 6.5 to 7.0 lakh tons as against an additional capacity of 4.30 lakh tons required. This surplus capacity, which would roughly represent about 25 to 50 per cent. of the total International trade in SRs, may lead to change in the price structure and also inter-regional flow of the products. Notwithstanding the fact that smaller plants and lower investments are required for the manufacture of some of the newer or speciality rubbers, their growth would be much lower in the Western countries. According to Gorden Atkinson, this factor would not always be a determinant for adding new capacity, as there was yet an opportunity for exports from developed countries in the fields of newer and speciality rubbers.

4.1.4. The total tonnage of overall World** SR production reproduced in Appendix VI although growing each year is falling off in its rate of increase as shown by the following figures—

TABLE NO. 4.3

Percentage of Total World Production

Year	Total World**	Total World** minus U.S.A.
1968 over 1967	15.5	20.9
1969 over 1968	12.8	21.5
1970 over 1969	5.5*	14.3
1971 over 1970	7.7	5.7

*This figure is low due to rubber and automotive strikes in U.S.A. which actually resulted in a negative growth for U.S.A.'s production in 1970 over 1969.

**Excludes Eastern Bloc and Mainland China statistics.

Source : International Institute of Synthetic Rubber Producers Inc. 29th March-1st April, 1971.

4.1.5. The table below contains figures of SR consumption as a percentage to that of total Rubber over the period 1953 to 1970 for three different areas namely the U. S. A., Western Europe and Japan.

TABLE NO. 4.4

Percentage of Synthetic Rubber in Total Rubber consumption

Year	U.S.A.	Western Europe	Japan
1953 . . .	58.6	6.8	2.2
1963 . . .	74.8	47.5	39.5
1965 . . .	75.0	53.4	46.6
1967 . . .	76.9	56.9	52.9
1969 . . .	77.0	59.5	60·7
1970 . . .	77.8	61.8	63.0

*Estimated

Source : Proceedings of the Conference on Preferred Polymer, 20th June 1969, Bombay.

*Rubber Statistical Bulletine March, 1971.

4.1.6. It would be observed from the above Table that production of SRs both in absolute and relative terms had been making rapid progress over these years. Another significant factor, however, is that while the total tonnage of SR production had risen from 3 million tonnes in 1965 to 4.7 million tonnes by 1970 and is expected to rise further to 5.1 million tonnes by 1971, the rate of growth over the last three/four years has declined from 15.5 per cent between 1967 and 1968 to 5.5 per cent. between 1969 and 1970. As against this, the rate of growth witnessed in India has been of the order of 7.8 per cent. per annum over the last four years. (Vide Paragraph 7.1.2.1.) Another point that might be noted is that the United States account for almost 50 per cent of the World total of SRs. It would be noticed moreover that over this period the growth rates have been specially significant in respect of Western Europe and Japan

which were solely dependent on NR till as late as 1953. This development is all the more significant having regard to the fact that generally speaking, both in the matter of availability as well as price, NR has been offering effective competition to SRs.

4.1.7. Dr. Poznan M. Sorgo of Phillip Petroleum Co., is of the view that this growth in SR consumption at the expense of NR in spite of low prices of the latter must be due to other reasons. He enumerates these as below:--

(i) Technological advantages of SRs in various specific applications, over the more general purpose NR.

(ii) SR is sold as a standard product, technically specified, and in standard packaging thus enabling closer processing uniformity from batch to batch.

(iii) Availability of local supply thus reducing the level of inventories and correspondingly the overall requirements of working capital. In today's economic circumstances, with interest rates as high as they are, this becomes an important cost consideration.

(iv) The steady price of SR which unlike NR is not subject to short term fluctuations, enables the manufacturers to keep a closer control on cost of production and hence to plan more confidently for steady and acceptable profits.

4.1.8. UNCTAD in its Commodity Survey (1968) has concluded that upto 1975 the growth in the potential supply of NR would remain below that of World demand for all Rubbers and, therefore, of necessity, the percentage use of SRs must considerably increase. The potential production capacity of SRs would depend on the existing capacity together with what additional capacity was created. There seems little reason to doubt that capacity would continue to be greater than actual production.

4.2. **Uses of various types of Synthetic Rubber :**

A brief survey of the technological properties and merits of various newer Elastomers given in the following paragraphs, would provide an opportunity for examining the

question of what new Polymer would best suit India's immediate needs in the wider context of technical-economic circumstances that are specific to India.

4.2.1. The most widely used SR is still the general purpose SBR. The various grades of SBRs, by themselves provide a spectrum of polymers designed to meet the various specific needs. Moreover economies and relative ease of processing, generally good performance because of its anti-shrinkage, good electrical properties, excellent processing and good tack and green strength, higher abrasion resistance etc., make it still the most widely used S. R. The excellent blending characteristics of SBR with other elastomers both natural and synthetic such as NR, PBR, Nitrile Rubber, Neoprene, Reclaimed etc. imparts flexibility in the matter of price, properties, and processing and thus add to its attraction. Tyres and footwear are probably the two largest consumers of SBRs. Other applications include adhesives, cables, belting and many general mechanical applications. SBR latex is used for bedding, upholstery, carpet backing etc. The main inhibiting factor which has been restricting its use for heavy duty tyre service, is its intense heat building property.

4.2.1.1. In a paper on "Solution SBR in tyres" presented during the Synthetic Rubber Symposium, held under the auspices of ARMII in Calcutta in 1969, Mr. R. S. Hanmer and Mr. K. R. Haws of Phillips Petroleum International have stated that an emerging trend in SR production is towards Butadiene based Elastomers made in solution process with Alkylithium catalysts. Its performance in mixtures with NR for heavy duty service and with SBR for passenger tyres is well documented. "Solution SBRs" made in this process have greatest interest as specialty rubbers specifically designed for some particular applications. It gives five to ten per cent. better treadwear than the SBR 1500.

4.2.2. Other important SRs which have been progressively making inroads in the field of rubber goods industry hitherto being dominated by SBR are Polybutadiene, Butyl, Nitrile, Poly-chloroprene and Poly-Isoprene. The main applications of these SRs with their merits and demerits are briefly presented in Table 4.5.

TABLE No. 4.5

Synthetic Rubber's Main Applications alongwith their Advantages and Disadvantages

Rubber Type	Main Applications	Advantages	Disadvantages
1. Poly Butadiene .	(i) In combination with NR & SBR.	(i) High resilience	(i) Low tack.
	(ii) Primarily designed for use in commercial vehicles and general heavy duty uses.	(ii) Improved crack resistance.	(ii) Low wet traction.
	(iii) Produced by the solution process all over the world, and is expected to be available as a liquid rubber soon. It is not available as latex.	(iii) Improved wear. (iv) Mileage at high speed. (v) Resistance to the effect of Oxygen and (vi) High filler/oil loading.	(iii) Cutting and Chipping and, (iv) Difficult processing.
2. Butyl . .	(i) Inner tubes, (ii) Plant lining, (iii) Belting, (iv) Cables, (v) Rubber rollers, (vi) Battery boxes, (vii) Hoses, (viii) Electrical mouldings and fittings, (ix) Tyre curing bags and bladders etc.	(i) Low permeability. (ii) Resistence to heat natural weathering and to attack by wide range of chemicals.	. . . .

3. Nitrile . .	(i) Hoses for containing water, chemicals and gases, (ii) oil seals on Mechanical devices especialy in motor cars, (iii) Foot wear, (iv) Gaskets, (v) Pigment binders, (vi) PVC additives, (vii) Brake linings, (viii) Paper re-inforcement, (ix) Textile treatment etc.	Possess all the characteristics of Butyl in addition to compatibility with several plastics and resins P.V.C. in particular. (*Source :* The story of S.R. by the British Association of Rubber Manufacturers, June, 1968).	
4. Poly-Chloroprene	(i) Adhesives, (ii) Conveyor belts, (iii) Seals, (iv) Gloves, (v) Gaskets, (vi) Cables, (vii) Plant lining, (viii) Automatic extrusions etc.	(i) High temperature and weathering resistance. (ii) Resilience to oils and a large range of chemicals.	Manufacturing process is fairly expensive as compared to SBR or Butyl because of the nature of Chloroprene.
5. Poly-Isoprene .	(i) Adhesives, (ii) Golf Balls, (iii) General mechanical applications.	Has all the characteristic properties of becoming all purpose rubber depending upon its relation with NR.	High cost of Monomer process makes it difficult to compete with price levels of NR.

4.3. **Indian Developments :**

4.3.1. Development of Rubber-based Industries began in the second half of the last century following the discovery of the process of vulcanisation by Charles Goodyear. It received a further boost after the discovery by Michelin of Pneumatic traction towards the end of that century. Since then, both the demand for and consumption of Rubber have been increasing rapidly all over the world, particularly in the developed countries, as a part of their industrialisation progress. So far as India is concerned, however, this industry started rather late and the main developments took place from 1935 onwards when the first major tyre factory was established by Dunlops near Calcutta. Prior to that, however, certain small scale users of Rubber, for the production of some other Rubber end-products, had begun operation in the twenties. Under the stimulus of wartime shortages and postwar planned development, the Indian industry has also grown at a rapid pace. Domestic production of NR has also increased and has been increasing quite rapidly. From 1963 we have also entered the field of SRs. The position today is that the supplies of Rubber, particularly of NR have generally speaking, been unable to keep pace with the domestic demand with the result that shortfalls have had to be met by imports, be they, of NR or of progressively increasing quantities of SRs including special purpose Rubbers. It can safely be stated that by now, use of these SRs including the general purpose SBR, with which we are here most concerned, has been technologically fully established. This process of development, is bound to continue although Indian trends are likely to differ in certain respects from world trends.

4.3.2. Nevertheless we feel that the actual and prospective pattern of production and consumption within this country would have to be considered in the broad world perspective. A basic factor which differentiates us from most of the other more developed economies in the overall pattern of Rubber consumption, is that we are ourselves a substantial producer of NR. Therefore, even if justified technologically, we cannot visualise the growth of SRs which

is in any case capital intensive and involves substantial foreign exchange investments both in respect of fixed and current assets including the intangible ones in the shape of purchase of technology, at the expense of simultaneous intensive development of our full potentials of N. R.

4.3.3. It however seems to us that having regard to certain inherent limitations as regards (i) utilisation of surplus land between competing crops, (ii) the relatively longer gestation period and higher capital and maintenance costs of Rubber plantations as compared to most other crops, as well as (iii) the prospects in the absence of any major agronomic breakthrough in the meanwhile, of stablisation of average yields of Rubber per hectare of land after reaching an optimum level within the next few years, a situation may thus develop by the early eighties, when the present rate of annual growth in the production of NR of approximately 10 to 12 per cent. per annum, would sharply taper off. At the same time, as industrial progress gains further momentum the total demand of all Rubbers would continue to rise probably at a rate even faster than the approximately eight per cent rate of growth observed over the last few years (Vide paragraph 7.1.). In other words, by about the end of the present decade, the relative need for increased supplies of SRs would undergo a substantial change over the proximate pattern.

4.3.4. In the short run, however, unlike the world trend as forecast in the UNCTAD Survey, the internal position seems to be that growth of supply of NR has if anything, slightly exceeded, particularly during the last year, the rate of growth of the overall demand for all Rubbers. Variety-wise again it seems to us that having regard to the present structure and growth potential particularly of our tyre industry, with its greater emphasis on commercial vehicles, in the short run, in respect of SRs there would be a larger relative demand for PBR rather than for general purpose SBR

5.1. **Growth :**

5. Progress and present position of the Industry

5.1.1. In the Second Plan, high priority was given to the establishment of a SR plant in Uttar Pradesh based on Ethyl Alcohol. This was the only raw material then available in abundance being produced from the by-product molasses of the old established and still growing cane sugar industry.

5.1.2. According to the Company, during 1957-58 several foreign teams from the USA (Lummus, Firestone and Goodyear) were invited to study the feasibility of this proposed project. We were told that all the teams had agreed on the project being based on Alcohol because of the peculiar circumstances then prevailing, even though by then in almost all other developed countries Alcohol had been abandoned as a basic raw material for SRs. With the possible execption of a unit in Brazil, every other known producer in the world was by then using Naphtha instead for the manufacture of SRs.

5.1.3. In coming to a decision regarding the establishment of a SR plant, apart from technological factors, certain inherent limitation to the unlimited expansion of domestic production of NRs due to paucity of land and other factors, had also been taken into account.

5.1.4. However, till 1958-59 no real progress for the setting up of a SR plant could be made presumably due to lack of interest on the part of the proposed collaborators. Subsequently, as a result of detailed examination of the various proposals, a decision was finally taken by the Government to allow the establishment of SR plant in the private sector. The promotors of the enterprise were M/s Kilachand Devchand & Co. Pvt. Ltd. They secured the active financial and technical collaboration of M/s Firestone Tire & Rubber Company, U. S. A. in implementing this project.

5.2. **Location :**

As pointed out by the Polymer Corporation in their recent Report, the development of a SR industry has naturally to be planned to obtain the benefits of economic concentration. A SR complex therefore, needs to be located

either close to the market for its product or near to economic source of the basic raw material, namely, Alcohol and/or Naphtha. The Alcohol based Bareilly Complex of M/s Synthetics & Chemicals Ltd. is properly located to take advantage of the proximity of a number of sugar/Alcohol producing units in that State. On the other hand, this situation has placed it at some disadvantages in relation to its distance from the major consuming areas.

5.3. **Present position :**

M/s Synthetics & Chemicals Ltd., continue to be the only unit at present engaged in the manufacture of SBR type SR based on Alcohol. The particulars of the Company are briefly given below:

5.3.1. This is a Public Limited Company managed by a Board of Directors numbering seven at present. The authorised capital of the Company is Rs. 15 crores. Some further details as regards issued and paid-up capital, reserves and assets and liabilities of the Company, are discussed in paragraph 17.

5.3.2. **Foreign Collaboration :**

5.3.2.1. SBR produced by the Company is classified under three major varieties, namely, S-1500, S-1502, S-1712 (O. E.) and S-1958 in conformity with the International Standards. In building this project the Company received know-how from the following Companies:

(i) M/s. Firestone Tyre & Rubber Co., Akron—Ohio, U.S.A.	Synthetic Latex and Synthetic Rubber plants.
(ii) M/s. Union Carbide Co., U.S.A.	Butadiene plant.
(iii) M/s. Chemische Werke, Huls, West Germany.	Styrene plant
(iv) M/s. Air Reduction Co., Inc. U.S.A.	Ethylene plant

5.3.2.2. For purposes of engineering and construction work, the Company received the assistance of the following concerns :—

(i)	M/s. Lummus Company Inc. New York, U.S.A.	Engineering & Construction Contractors.
(ii)	Carl Still Co., West Germany.	Styrene plant Engineering.
(iii)	Shell International, U.S.A.	Effluent treatment (partial).
(iv)	International Combustion Ltd., Derby, U.K. & India.	Boiler plant Engineering & Construction.
(v)	M/s. Head Wrightson Co. Inc., U.K.	Water treatment.
(vi)	Siemens Eng. Company, West Germany & India.	Power generation & distribution.

5.3.3. **Products of the Plant.**—The main varieties of SRs produced in the plant are marketed under the Company's trade mark 'SYNAPRENE'. These Rubbers are being made to International Standards and also bear the International grade symbols such as S-1500 (General purpose staining type), S-1502 (General purpose non-staining type), S-1712 (General usage staining type oil extended Rubber) and S-1958 (non-staining self reinforced Rubber specially required by the footwear industry). Other grades such as Synaprene 1808 as well as certain Carbon Black master batches are being experimentally made in small quantities from time to time, to meet special demands.

5.3.4. Unlike the practice prevalent in many other plants abroad, the Company itself also produces the principal intermediates entering into the composition of SBR, namely, Styrene and Butadiene. Of late, some attempt is also being made by it to substitute certain other raw materials, such as, Catalysts and Extender oil which are now imported. Certain valuable by-products like Toluene, Bentol are recovered in the process of synthesis. These, especially Toluene, are separately marketed. Some further

details of these operations and transactions would be found in paragraph 9.2.

5.3.5. **Employment.**—The Company is reported to have had 1823 workers on its roll at the end of December 1970. Of these, 262 belonged to the supervisory cadre (technical, non-technical and top management), 349 to the administrative cadre, 1049 workers were employed at the factory and the balance of 163 at Head-office and sales centres. The average emoluments per man per month ranged from Rs. 279 for the administrative staff to Rs. 4,053 for the top management. The overall percentage of the salaries and wages to the total turnover in 1970 was about 8.2.

6. Capacity and Production

6.1. **Capacity :**

According to the information furnished to us by the Ministry of Petroleum & Chemicals, M/s. Synthetics & Chemicals Ltd., had been permitted to manufacture General purpose Synthetic Rubber-GRS (Cold, Hot, Oil Extended and Latices) to the extent of 20,000 tonnes per annum, to be raised to 30,000 tonnes. The Company has informed us that its present capacity was 30,000 tonnes. This was made up of Dry and Oil Extended Rubber in the ratio of 60:40. In actual practice, however, it followed a 55:45 ratio between Dry and Oil Extended Rubber. We are, however, satisfied from the information furnished to us, as well as from the data collected by our Cost Accounts Officer, that the installed capacity of around 30,000 tonnes should really be taken in terms of Dry Rubber. The reasons for this conclusion are contained in the succeeding paragraphs.

6.2. We find from the broad points of Agreement with their collaborators, M/s. Firestone Tire & Rubber Co., (Annexure V of their application dated 6th August 1970 for expansion of Synthetic Rubber capacity from 30,000 to 50,000 tonnes) that "Firestone guarantees that Styrene Plant

will produce at the rate of at least 9,000 short tons (equivalent to 8,200 metric tonnes) of Polymer grade Styrene per year. The Butadiene plant will produce at the rate of at least 15,000 long tons (equivalent of 15,300 metric tonnes) of Butadiene per year and that the G. R. S. plant will produce at the rate of at least 30,000 long tons (Dry Rubber hydrocarbon content) per year." It is noted further that in paragraph 6B (b) sub-paragraph-ix in the same application, the Company has claimed :

"(a) The requirement of Styrene for this proposed expansion programme is of the order of 11,000 metric tons which our present plant is capable of feeding in lieu of innovations and improvements made by way of the newer type of catalyst as well as in design of dehydrogenation furnaces. No expansion of Styrene plant is therefore envisaged for meeting this requirement."

"(b) The requirement of Butadiene for the proposed expansion will also be met from our present Butadiene plant. As a result of our experience in running this alcohol-based Butadiene plant for so many years it is possible to run it at higher rates by more frequent catalyst changes, improved regeneration cycles, better temperature profiles and through minor alterations in process cycles, heat exchanger, sizing etc."

6.3. **Production :**

6.3.1. The production of all grades of SBR amounted to 15589, 21810, 25189, 24590 and 30,338 tonnes in 1966, 1967, 1968, 1969 and 1970 respectively. It would be observed from the Table-6.1. that except for the year 1969, the production of SBR had been progressively increasing from year to year. The lower level of production in the earlier years could be attributed mainly to (a) initial teething troubles, (b) consumer resistance to a new product, (c) shortage of Alcohol necessitating some imports at high cost, and (d) plant break-down for about six months from December 1965 to May 1966.

Foot note : Underlining of portions within quotations by us.

TABLE NO. 6.1

Statement showing Capacity Production (total and gradewise) and Percentage Capacity Utilisation from 1963 to 1970

(In tonnes)

Year	Product with specification	Annual Installed & Licensed capacity	GRADEWISE PRODUCTION										TOTAL	%age of capacity utilisation	Production of Dry Rubber
			S-1500	S-1502	S-1712	S-1513	S-1514	EPB	S-1714	S-1958	S-1006	S-1944			
1963	Synthetic Rubber	30,480	4,448	1,287	2,802	..	..	..	..	..	..	..	8,537	28·45	7,697
1964	Synthetic Rubber	30,480	5,574	1,476	4,758	..	..	..	..	..	..	..	11,808	39·36	10,380
1965	Synthetic Rubber	30,480	6,670	2,854	4,391	..	347	5	54	1,248	14	..	15,583	51·93	14,207
1966	Synthetic Rubber	30,480	5,348	2,282	6,241	..	293	..	..	1,401	..	24	15,589	51·96	13,717
1967	Synthetic Rubber	30,480	5,867	3,563	8,688	..	405	..	..	3,226	..	61	21,810	72·67	19,203
1968	Synthetic Rubber	30,480	4,703	4,400	11,347	500	105	23	115	3,996	..	..	25,189	83·96	22,051
1969	Synthetic Rubber	30,480	4,667	4,686	11,693	245	173	..	..	3,126	..	..	24,590	81·97	21,005
1970	Synthetic Rubber	30,480	5,580	5,693	14,098	325	..	492	..	4,150	..	..	30,338	101·13	26,427

NOTE.—Ratio between Dry Rubber and Oil Extended Rubber was 55 : 45 in 1968, 51 : 49 in 1969 and 54 : 46 in 1970. For the earlier periods (1963 to 1967), the ratio was assumed to be 60 : 40.

6.3.2. During 1969, even though the factory had to depend on imported Alcohol to a lesser extent than in 1968, the decline in production was due to the plant remaining closed for about two months on account of labour trouble. In 1970, the production picked up considerably mainly because of the availability of indigenous Alcohol in adequate quantity so that imports could be eliminated altogether. Barring any unforeseen eventualities, the raw material supply prospects, for the next 2/3 years appear to us to be quite bright. In fact this view is apparently shared by the Company which has reapplied to Government for sanction to its expansion scheme.

6.3.3. The plant worked for 323 days in 1968, 274 days in 1969 and 309 days in 1970. As stated earlier, during 1969, the plant remained closed for about two months and this accounts for the fall in the number of days worked. On the other hand, during 1970, the total production of all grades of SBR was of the order of 30,338 tonnes. In terms of Dry Rubber this came to 26,427 tonnes. The Company has placed its estimates of production for 1971-73 at only 24,000 tonnes of all Rubbers and would like us to work out costs accordingly. We are unable to agree. Keeping in view (i) the recent (1970) performance and the number of days worked to reach it, (ii) the potential plant capacities, (iii) the easier position as regards availability of principal raw materials, and (iv) our as well as the Company's own implied estimates of demand, *we have placed the actual production of all grades of SBRs at between* 34,000-36,000 *tonnes for the period ending December* 1973. *In terms of Dry Rubber, this would mean* 30,000/31,000 *tonnes against guaranteed plant performance of at least* 30,000 *long* (30480 *metric*) *tons.* Moreover, to enable it to optimise the plant utilisation which is highly desirable on general economic considerations, and should be, to the Company's own advantage, we are providing in our estimates some special provision for maintenance and repairs which has been asked for by the Company. This is dealt with in greater detail later in paragraph—17.

6.3.4. One of the major reasons advanced by the Company for adoption of such a low figure of production in the

future estimates is that it is not able to market all its produce and the uncertainties of future supplies of Alcohol. It is observed that the Company had made an application in July 1969 to Government for expansion of its production capacity from 30,000 to 40,000 tonnes and a further application in August 1970 for expansion from 30,000 to 50,000 tonnes. It is difficult to understand how the Company could have planned for an expansion of its capacity from 30,000 to 50,000 tonnes unless it had been able to foresee a favourable market for its products in the future. We are, therefore, of the opinion that any temporary set-back in sales of SBR would not justify the adoption of the very low production level of 24,000 tonnes per annum for purposes of our estimation.

6.3.5. Furthermore, the Company in the same application for expansion has stated that the Bareilly plant is capable of producing at a steady rate of 3,000 tons/month i.e. 36,000 tons/year as of to-day. It has further substantiated its claim for this higher level of production capacity from the figures of the actual production for the eight months ending May 1970. The data so furnished by the Company is reproduced in the Table below :—

TABLE NO. 6.2

Monthly production of Synthetic Rubber

	Tonnes
1969—	
October	3,010
Novemher	3,023
December	3,506
1970—	
January	3,226
February	2,902
March	3,424
April	2,953
May	2,842
TOTAL	24,886

6.3.6. It would be observed from the foregoing that the average actual production over this eight monthly period was 3100 tonnes per month. This also leads us *pro rata* to a figure of 37,200 tonnes for 12 months. Even allowing a one month stoppage for plant renovation etc., this *pro rata* figure would come to 34,000 tonnes. Moreover, it would be observed from the figures of consumption furnished earlier that the growth rate has been of the order of about 20 per cent at two yearly intervals. Extending the same principle of 20 per cent biennial growth over the figure of 1969-70 of nearly 30,000 tonnes, would also support an estimate of between 34,000-36,000 tonnes during the future price period.

6.3.7. Taking all these factors into account we estimate the Company's present annual net productive capacity at between 34000/36000 tonnes of all types of Rubber (including Oil Extended Rubber) for the price period ending December 1973. Broadly broken up into components, these figures would be somewhat as follows:—

TABLE NO. 6.3

Unitwise capacity of SBR Plant

(In tonnes)

	Low estimate	Mean	High estimate
Styrene . . .	8,000	8,250	8,500
Butadiene (Self) . .	16,250	16,500	16,750
Butadiene (NOCIL) .	5,500	5,750	6,000
Extender Oil . .	4,250	4,500	4,750
	34,000	35,000	36,000

6.3.8. Before leaving this topic we might add that this view is further supported by a perusal of the figures tabulated in Appendix VI. It would be observed therefrom that the estimated production capacity of the Bareilly plant as reported to the International Institute of Synthetic Rubber Producers was also placed at 32,000 tonnes for 1970 and 36,000 tonnes for 1971.

7.1. **Consumption of Synthetic Rubber:**

7. Domestic Demand

Consumption of Synthetic Rubber in the country has increased fourfold during the past decade. In 1960-61 the consumption was of the order of 7397 tonnes which rose to 33160 tonnes in 1970-71. *In terms of percentage of the country's total consumption of New Rubbers, both Natural and Synthetic, the figure for the latter has risen from* 13.3 *per cent in* 1960-61 *to* 27.5 *per cent in* 1970-71. The following Table indicates the consumption of NRs and SRs from 1960-61 to 1970-71.

TABLE NO. 7.1

Consumption of New Rubbers both Natural and Synthetic: 1960-61 *to* 1970-71

(In tonnes)

Year	Natural	Synthetic	Total	% age increase over the previous year of Total Consumption	% age use of Synthetic Rubber
1960-61	48,148	7,397	55,545	2.2	13.3
1961-62	48,410	10,186	58,596	5.5	17.4
1962-63	53,553	10,723	64,276	9.7	16.7
1963-64	61,155	11,959	33,114	13.8	16.4
1964-65	61,057	15,285	76,342	4.4	20.0
1965-66	63,765	21,553	85,318	11.8	25.3
1966-67	68,685	23,592	92,277	8.1	25.6
1967-68	74,518	23,324	97,842	6.0	23.8
1968-69	86,615	27,238	113,853	16.4	23.9
1969-70	86,213	30,636	116,849	2.6	26.2
1970-71	87,227	33,160	120,387	3.0	27.5

Source: Rubber Board.

7.1.1. *There has been thus generally speaking, a slow but steady upward trend in the relative demand* for SRs over the last decade. *As industrialisation progresses, we believe, this trend is bound to continue.*

7.1.2. The pattern of consumption of SRs during the period 1966-67 to 1970-71 is endicated in the Table below:—

TABLE NO. 7.2

Grade-wise Consumption of Synthetic Rubber—1966-67 *to* 1970-71

(Tonnes)

Sl. No.	Grade	1966-67	1967-68	1968-69	1969-70	1970-71	Annual Compound Rate of Growth %
1.	Styrene Butadiene Rubber (SBR).	20,830	20,266	24,198	26,969	28,118	7.8
2.	Butyl Rubber . .	1,009	1,479	1,516	1,812	2,702	above 25
3.	Neoprene Rubber .	372	314	326	384	460	5.5
4.	Nitrile Rubber . .	200	254	325	435	530	above 25
5.	High Cis. poly-Butadiene Rubber .	120	114	5	58	577	above 25
6.	Latex* .	392	355	433	466	673	14.5
7.	Others .	669	542	435	512	100	(—)4**
	TOTAL .	23,592	23,324	27,238	30,636	33,160	8.9

* Including SBR Latex.

** Approximately Annual Average.

Source : (i) Indian Rubber Statistics, Volume 12 & 13, 1969-70.

(ii) 1970-71 figures are taken from Rubber Board's letter dated 6th July, 1971.

7.1.2.1. It would be observed from the above Table that the growth of consumption of SBR which accounted for nearly 85 to 90 per cent. of the total consumption of SRs during 1966-67 to 1970-71 has been increasing at a compound rate of 7.8 per cent per annum.

7.1.2.2. As regards the other varieties of SRs which together account for only about 10 to 15 per cent of the total consumption, the rates of growth, except in the case of Neoprene and others, have been specially significant as compared to that of SBR. *It would appear therefore, that on the whole, under existing Indian conditions, SBR has been playing the predominant role in the field of SRs. We are of the view that this feature would persist for sometime longer. We might add that as expert estimates referred to in paragraph* 4.1.2 *indicate, even in the world SR economy, SBR (both emulsion and solution types) is likely to continue to contribute well over* 50 *per cent of the total production of SRs.*

7.1.3. **Rate of growth.**—The rate of growth in world production and consumption of SRs has been more spectacular. This partly indicates advancement in technology as well as an attempt at self-sufficiency by the developed economies, especially those which have to depend entirely on imports for supplies of NR. From an initial figure of the order of 0.5 million tons in 1947-49, (annual averages) world production and consumption of SRs rose to something like 3.5 million tons (annual average 1966-68) thus recording an almost seven-fold increase in two decades. This figure had risen further to 4.8 million tonnes by 1970. It is expected to reach 5.1 million tonnes by the end of 1971. The Table below summarises global production and consumption of New Rubbers, both NR and SRs over the period 1947 to 1968 and 1970.

TABLE No. 7.3

Growth in World Rubber Production and Consumption—1947—1968 *and* 1970

Item	Annual average 1947—1949	Annual average 1956—1958	Annual average 1966—1968	Increase 1956-58 over 1947—1949	Increase 1966-68 over 1956—1958	Increase 1966-68 over 1947—1949	1970	Increase 1970 over 1947—1949
	Tons			Percent			Tonnes	
Production								
Natural . . .	1,425,000	1,910,000	2,483,333	34.0	30.0	74.3	2,915,000	104.5
				(3.1)	(2.5)	(3.5)		
Synthetic . .	510,612	1,238,750	3,565,000	142.6	187.8	598.2	4,847,500	849.4
				(13.0)	(15.7)	(28.5)		
TOTAL .	1,935,612	3,148,750	6,048,333	62.7	92.1	212.5	7,762,500	301.1
				(5.7)	(7.7)	(10.1)		

Consumption

Natural . .	1,323,333	1,934,167	2,599,167	46.2	34.3	96.4	2,887,500	118.2
				(4.2)	(2.9)	(4.6)		
Synthetic . .	518,333	1,209,167	3,502,500	133.3	189.7	575.7	4,530,000	773.9
				(12.1)	(15.8)	(27.4)		
TOTAL .	1,841,666	3,143,334	6,101,667	70.7	94.1	231.3	7,417,500	302.8
				(6.4)	(7.8)	(11.0)		

NOTE:—Figures in brackets are Annual averages.

Source : (1) Natural Rubber News—March 1970 Malayan Rubber Fund Board, Washington U.S.A.
(2) 1970 figures are taken from Rubber Statistical Bulletin, March, 1971.

7.1.3.1. Varietal distribution of various types of SRs in U.S.A. and Canada in 1960 and 1969 is given in the Table below :—

TABLE NO. 7.4

Varietal distribution of various types of SRs in U.S.A. & Canada in 1960 and 1969

(In tonnes)

Type of SRs	U.S.A.			Canada		
	1960	1969	%age increase 1969 over 1960	1960	1969	%age increase 1969 over 1960
Styrene and Butadiene .	1,184,864	1,42,5640	20.3 (2.1)	1,04,157	1,26,840	21.8 (2.2)
Butyl	99,522	131,875	32.5 (3.2)	29,003	34,659	19.5 (2.0)
Nitrile	38,507	69,981	81.7 (6.9)	N.A.	N.A.	..
Poly-Butadiene . .	N.A.	267,767	..	N.A.	N.A.	..
Poly-Isoprene* . .	N.A.	186,451*	..	N.A.	N.A.	..
Others	136,600	204,587	49.8 (4.6)	29,075	37,312	28.3 (2.8)
TOTAL . .	1,459,493	2,286,301	56.6 (5.1)	162,235	198,811	22.5 (2.1)

* This includes E.P. also.

Source : Rubber Statistical Bulletin—March 1971 (Vol. 25, No. 6).

NOTE : Figures in brackets represent compound growth rate per annum.

7.1.3.2. It would be seen from the Table No. 7.4 that during the decade under reference, the Nitrile type S.R. registered the highest increase in the U.S.A. being 81.7 per cent. This accounted for a nearly 6.9 per cent rate of growth per annum. This was followed by the 'Others' being 49.8 per cent which represented a rate of growth of about 4.6 per cent per annum. S.B.R. increase for this decade was only of the order of 20.3 per cent representing a rate of growth of 2.1 per cent per annum. In Canada, the percentage increase was highest for the 'Others' types, though individually the Styrene type stood first, followed by Butyl—the respective percentage being 21.8 and 19.5 representing a rate of growth of about 2.2 per cent and 2.0 per cent per annum.

7.1.3.3. In the matter of consumption of all New Rubbers whether Natural or Synthetic, *the rate of growth in India has been of the order of 8.1 per cent per annum over the last ten years, as compared to the somewhat lower World*

average of 6.5 per cent per annum. In the matter of per capita annual consumption, however, we still stand among the lowest in the World at 0.21 Kg. per head against 12.0 Kg. in U.S.A., 8.2 Kg. in U.K. and 7.5 Kg. in Japan, the World average being 6.04 Kg.

7.1.3.4. The Table No. 7.5 gives the proportional usage of SRs in the total consumption of New Rubbers.

TABLE NO. 7.5

Proportional usage of SRs in the total consumption of Natural and Synthetic rubbers in 1969 in different countries

Name of the country	% usage
U.S.A.	77
Canada	72
Brazil	67
Federal Republic of Germany	63
Japan	61
U.K.	57
India	26

Source : Rubber Board.

7.1.3.5. *It would be observed that having made a late start and being a substantial producer of NR, the share of SR in the total consumption of New Rubbers is appreciably lower in the case of India than in most other countries.* It would be further recalled that over the last ten years, the proportionate *Indian consumption of SRs has been rising at a faster rate than is the case with N.R.* We have been given to understand by the Rubber Board that some of the other factors contributing to this situation, are (a) that India has been producing so far only one type of SR, *viz.*, SBR and (b) that since SBR is more commonly used in the construction of passenger car tyres than for truck and other heavy duty tyres, the scope for its use by the domestic tyre Industry is relatively limited.

7.2. Future Demand:

7.2.1. In paragraph 4.3.2. and 4.3.3. we have broadly discussed the various factors which would govern the consumption of NR *vis-a-vis* SR in India in the next few years. The actual progress of consumption of all Rubbers (including New and Reclaimed Rubbers) divided into Tyre and non-Tyre uses for the period 1966-67 to 1970-71 is given in the following Table:

TABLE NO. 7.6

Consumption of New Rubbers including Reclaimed by Tyres and non-Tyres Industries during 1966-67 *to* 1970-71

(In tonnes)

Year	Consumption of total New Rubbers		Total New Rubbers including Reclaimed
	Tyre	Non- Tyre	
1966-67 . . .	43,235	59,952	103,187
1967-68 . . .	44,448	65,256	109,704
1968-69 . . .	62,200	65,800	128,000
1969-70 . . .	63,716	67,018	130,734
1970-71 (Estimated) . . .	70,296	64,006	134,302

Source: (i) Figures for 1966-67 and 1967-68 as well as that in respect of Tyres for 1969-70 and 1970-71 are taken from the proceedings of Conference on Preferred Polymer, 1969.

(ii) Figures for 1968-69 are taken from Perspective Planning Commission's Material Balance on Rubber, June 1970.

(iii) Figures in respect of New Rubber including Reclaimed for 1969-70 and 1970-71 are taken from Rubber Board's Monthly Bulletins—February and May, 1971.

(iv) Figures for Non-Tyre Sector for 1969-70 and 1970-71 are worked out by difference.

7.2.2. The above Table would show that the consumption of New Rubbers in the case of Tyres has been increasing at the rate of about 6,765 tonnes per annum from 43,235 tonnes in 1966-67 to 70,296 tonnes (estimated) in 1970-71. In respect of the non-Tyre usage, the increase has been at a much slower pace.

7.2.3. During the course of our Inquiry, we have received various estimates regarding future production and consumption trends for various types of Rubbers. In Table No. 7.7 we present the future demand estimates of New Rubbers for the years 1970-71 to 1973-74 and 1978-79 received from different authoritative sources. At the Conference of Preferred Polymer in 1969, knowledgeable persons on behalf of the Industry had expressed varying views as to the actual requirements of New Rubbers. Whereas, on the one hand Dr. Banerjee and Mr. Bhowmik had put the consumption figure of New Rubbers in India by 1973-74 at 1,19,397 tonnes, Mr. K. N. Phillip, on the other hand, had placed the same at 2,10,000 tonnes. This shows a marked divergence in views even amongst the experts. Any attempt at such estimation is thus a somewhat hazardous venture.

TABLE No. 7.7

Statement showing the future demand estimates of New Rubber for the years 1970-71, 1971-72, 1972-73, 1973-74 *and* 1978-79 *as assessed by the different agencies*

(in tonnes)

Source	1970-71	1971-72	1972-73	1973-74	1978-79
1. Rubber Board	120,387 (actuals)	135,000	150,000	165,000	Not furnished
2. Polymer Corporation Ltd., (a study of Indian Rubber Industry).					
(a) In case the first PBR plant at Koyali of 20,000 tonnes capacity is installed in January, 1974.	134,900	147,000	159,700	174,500	265,100
(b) In case the above plant is installed by 1980.	134,800	147,000	159,700	175,200	280,200
3. Rubber Panel of the Development Council for Organic Chemicals Industries (Report prepared by Mr. M. M. Sabharwal).	140,000	156,000	166,000	182,500	303,000
4. Indian Rubber Industries Asson., Bombay .	120,397 (actuals)	134,910 (estimated)	154,380	172,650	Not furnished

5. Article by Dr. D. Banerjee and Shri M. L. Bhaumik entitled "Outlook for Synthetic Rubber in India" published in the proceedings of Conference on Preferred Polymers 1969.	105,039	109,825	114,611	119,397	138,541 (year 1977-78)
6. Article by Shri K. M. Phillip entitled 'Polymer Requirement of the Rubber Industry' published in the proceedings of Conference on Preferred Polymers, 1969.	142,000	161,000	184,000	210,000	370,000

7.2.4. In the earlier paragraphs we have discussed the world trends in consumption pattern of New Rubbers as well as Indian developments of rubber consuming industries. According to Dr. Banerjee, Director and Technical Adviser, National Rubber Manufacturers Ltd., there is a progressive change in the Western countries from cross ply to radial ply tyres. France had gone to the extent of using 90 per cent of radial tyres; other Western countries 32 to 35 per cent; and heading towards 52 to 60 per cent; U.K. 40 per cent and U.S.A. 10 to 12 per cent. In the carcass reinforcement, polyester and glass are also making headway in the design of tyres, thereby considerably improving their performance. Such changes affect the consumption patterns of both Tyre cords and Rubbers.

7.2.5. We have also discussed earlier the growth of NR in India and its limiting factors, as well as the entry of SBR into our country's field and the steady growth of its supply. While in the developed countries with rapid technological progress, the demand for several types of New SRs is rapidly increasing and the substitution process is taking place as between the end products rather than between different forms of rubbers in the same end product, in our country, similar developments are still somewhat remote. Therefore the two principal New Rubbers which would still continue to be consumed for sometime to come, are the NR and SBR. Mr. Shinnosuke Katsumoto of Japan Synthetic Rubber Co. Ltd. in his paper on 'Japan's Economy and Synthetic Rubber Industry' (published in International Institute of Synthetic Rubber Producers Incorporated, Sydney, Australia 29th March—1st April, 1971), has observed that SBR would still maintain its position as a popular all-purpose rubber, which is the easiest to use, even after PBR is developed and marketed. Its role as a basic rubber is now definitely fixed and its usage is still increasing gradually. He was firmly of the view that unless an epoch-making New Rubber appeared, the strong foothold SBR had in the rubber industry would remain unchanged.

7.2.6. Taking the various factors into consideration as also the different views and estimates placed before us, we

feel that in estimating the future demand, a position somewhat in between the estimates of Dr. Banerjee and Mr. Bhowmik on the one hand, and Mr. Phillip on the other, would be an appropriate one. Accordingly, *we place the total demand for New Rubbers at* 1,52,000 *to* 1,64,000 *tonnes by the end of the year* 1973-74. *This would comprise of about* 34,000 *to* 36,000 *tonnes of SBR, which assumption is also supported by the growth trends of the past sales of M/s. Synthetics and Chemicals Ltd. for the period* 1967-70; *at about* 6,000 *to* 8,000 *tonnes for other special purpose SBRs and the rest to be met by NRs. In addition, there would be a further demand of* 20,000 *to* 25,000 *tonnes for Reclaimed Rubber, mainly required by the automobile industry for retreading purposes.*

7.2.7. *On the whole, therefore, we feel that the total demand for all types of Rubbers would be of the order of* 1,70,000 *to* 1,90,000 *tonnes for the period ending* 1973-74.

8. Raw Materials

8.1. The principal raw materials used in the production of alcohol-based SBR are Butadiene and Styrene. Alcohol from by-product molasses continues to form the main source of raw material for both these intermediate products. Butadiene is also available as a by-product in the manufacture of Ethylene from Naphtha by steam cracking. Styrene, however, requires Benzene in addition to Alcohol for its manufacture. Secondary chemicals required for the manufacture of SBR and its various other grades include Catalysts, Rosin acid, Fatty acid, Extender oil, Hydrated lime, Soda Ash and a number of other chemicals both Organic and Inorganic. Consumable stores comprise Kerosene, Lubricating oil, Diesel oil, Fire fighting chemicals, Engineering stores and spares and other miscellaneous items. Power and fuel are required for generation of steam and for running of other essential services in the plant. Of the various raw materials, Catalysts, Rosin acid, Extender oil, Sodium nitrite and a dozen other items are still required to be imported. The rest are indigenously available. The D.G.T.D. has stated that the raw materials required by the Company have been made available to it on a priority basis as per its actual requirements and in accordance with the prevalent import policy.

8.2. Principal Raw Materials:

8.2.1. **Styrene.**—Styrene is one of the intermediate products used in the manufacture of SBR. The Company produces it for captive use. In addition, a part of its requirement of Styrene is occasionally supplemented by procuring it from M/s. Polychem, a sister concern of this Company. There have been also sporadic sales of small quantities of Styrene. The installed capacity of its captive plant is 8,200 tonnes per annum. The production and consumption of Styrene from 1965 onwards as furnished by the producer are set out in the following Table.

TABLE NO. 8.1

Capacity and Production of Styrene of 99.2% *purity during* 1965 *to* 1970.

Sl. No.	Unit	1965	1966	1967	1968	1969	1970
1. Capacity .	Tonnes	8,200	8,200	8,200	8,200	8,200	8,200
2. Production .	,,	4,880	4,445	6,591	6,819	6,281	7,559
3. Consumption	,,	3,632	3,799	5,546	6,358	5,995	7,112
4 Capacity utilisation .	%	60.0	54.0	80.0	83.0	77.0	93.0

8.2.2. The above Table indicates that the captive capacity of the plant is somewhat in excess of its present requirement. This surplus could be readily utilised for the marginal augmentation of its output of SBR.

8.3. Butadiene (Alcohol—based):

8.3.1. This is another intermediate product required for the production of SBR which the Company produces for self-consumption. The installed capacity of this captive plant is around 22,860 tonnes (98.5 per cent purity). The Company contended that the effective capacity of its Butadiene plant, which was initially purchased as a second-hand one, stands at only 18,000 tonnes per annum, especially as the utilities to feed it were designed on that assumption. Since 1968 the Company started procuring small quantities of

petro-Butadiene from NOCIL which produces it as a by-product. As mentioned later in paragraph 8.3.3, it expects progressively to raise its offtake from this source to something like 7,000 tonnes of petro-Butadiene by 1973-74. The Table below gives the installed capacity, production, consumption and percentage utilisation of capacity of Butadiene during 1965 to 1970 as furnished by the producer.

TABLE NO. 8.2

Capacity and Production of Butadiene (98.5 per cent purity) during 1965 to 1970.

	Unit	1965	1966	1967	1968	1969	1970
1. Capacity .	Tonnes	22,860	22,860	22,860	22,860	22,860	22,860
2. Production .	,,	10,399	9,859	13,844	13,922	11,366	13,936
3. Total consumption .	,,	10,386	9,658	13,536	14,867*	14,791*	14,024*
4. Capacity utilisation.	%	45.49	43.13	60.56	60.90	49.72	60.97

*Includes purchases from NOCIL *vide* paragraph 8.3.3.

8.3.1.1. From the above Table it would be observed that the production of Butadiene has not so far reached the optimum level of the plant capacity. This is mainly, as stated earlier, on account of (i) limited demand for SBR in the earlier years (1963 to 1965), (ii) closure of the plant because of accident in 1966 and strike in 1969 and (iii) availability of cheaper petro-Butadiene from 1968.

8.3.2. We understand that the producer obtains its supply of Butadiene from M/s. NOCIL at the rate of Rs. 1600 per tonne naked in bulk ex-NOCIL's installation near Bombay. After adding to the fixed cost, transport and insurance charges of Rs. 51.62 per M.T. and octroi duty of Rs. 24.75 per trip, sales tax etc., the cost of Butadiene at the Company's plant at Bareilly worked out to Rs. 2148 per tonne on an average for 1970. We further gathered that according to the Heads of Agreement entered into by these two concerns, the supply of Petro-Butadiene would continue for a period of 10 years. The prices would however be re-negotiated after the

expiry of five years, *i.e.*, by the end of 1973. These Heads of Agreement further provide in the meantime for the escalation/de-escalation of the basic price due to increase/decrease of the duty in the Naphtha prices as obtaining from time to time. We also understand that as a result of the operation of this clause, the price of Naphtha in bulk has been raised by the supplier from Rs. 1655 to Rs. 1722.50 per tonne with effect from May 1971.

8.3.2.1. During the course of the public inquiry, as well as subsequent discussions, the Company laid stress on the point that its Butadiene plant stands in need of substantial renovation. It pointed out that the original design developed way back in 1942-45, was now almost totally outmoded. It was therefore, no longer practicable to secure supplies of suitable spare parts specifically in accordance with the original specifications. For any replacement therefore, it has per force to resort to special fabrication, and for unitised items like compressors, seek to adapt equivalent equipment somewhat different in specifications but more modern in design.

8.3.3. **Petro-Butadiene.**—NOCIL has stated that the installed capacity of its Petro-Butadiene plant was of the order of 7,200 tonnes. It further maintained that it was taking steps to optimise production and hoped to be shortly able to raise the level of supplies to the extent of its installed capacity. Quantity of Butadiene so far supplied to M/s. Synthetics and Chemicals by NOCIL, as reported to us, is given below:

TABLE NO. 8.3

Petro-Butadiene Supplies

Year	Tonnes
1968	1,274
1969	3,136
1970	4,543

8.3.4. The Indian Petro-Chemical Corporation, Baroda the prospective producer of High Cis Poly-Butadiene latex has informed us that its main raw material would be self-generated Butadiene received from its Naphtha cracker. The polymerisation would be done in the Olefins Projects at Koyali. Its representatives stated that the Koyali plant was not likely to have any surplus capacity of Butadiene for sale.

8.3.5. **Alcohol:**

8.3.5.1. The Company obtains its requirement of Alcohol in the form mostly of rectified spirit, from various distilleries mainly located in U.P., on the basis of allotment orders issued to it by the State Excise Commissioner. The price at which these supplies are made is governed by the Ethyl Alcohol (Price Control) Order issued from time to time. Under the latest Order dated 30th January 1971 the following prices have been fixed.

1. Absolute alcohol conforming to I.S.I. Standard No. 321—1952, naked for equivalent volume at 100 per cent V/V strength.	Rs. 250.50 per kilo litre
2. Rectified spirit conforming to I.S.I. Standard No. 321—59 naked for equivalent volume at 100 per cent V/V strength.	Rs. 227·75 per kilo litre

8.3.5.2. There are in all 24 distilleries in U.P. with an aggregate installed capacity of 228,085 kilo litres of industrial Alcohol per annum as on 31-12-1970. The total production of Alcohol from these distilleries for the corresponding period was 154,553 kilo litres. In the following Table are given the total production of rectified spirit as well as the supplies made to the Company since 1965 to 1970.

TABLE NO. 8.4

Production and Consumption of Rectified Spirit during 1965 *to* 1970

(Kilo litres)

Year	Production	Consumption of Alcohol by M/s Synthetics & Chemicals	Usage of imported Alcohol by M/s Synthetics & Chemicals
1965	96,029*	44,709	..
1966	102,520*	43,265	..
1967	58,047*	50,092@	19,447
1968	54,965*	57,266@	30,755
1969	109,096	47,702@	7,222
1970	140,907	54,390	..

NOTES.—(i)*These figures are taken from Tariff Commission's Report on the price structure of Industrial Alcohol (1969).

(ii) Figures of production from 1969 on words are as furnished by the All India Distillers' Association.

(iii) Figures for consumption have been furnished by M/s. Synthetics & Chemicals.

(iv) @These figures are inclusive of imported Alcohol.

(v) We are informed that as the supply position of Alcohol had deteriorated during 1966-67 and 1967-68 imports of Ethyl Alcohol for maintaining production of SBRs became necessary.

8.3.5.3. The Ministry of Petroleum and Chemicals has informed us that the prospects of adequate availability of indigenous Alcohol during the coming years appeared to be good. The representative of the All India Distillers' Association of India has stated that there should be no difficulty

in the procurement of around 100,000 kilo litres of Alcohol per annum from U.P. What was, however, needed was price stability.

8.3.6. **Benzene.**—The Company obtains its supplies of Benzene from the Hindustan Steel Ltd. (HSL). The HSL has stated that its optimum capacity for production of Benzene was about 40,000 tonnes per annum, while its present level of output from the three steel plants was just about 50 per cent of the rated capacity because of various constraints. It has added that it was committed to supply to M/s. Synthetics & Chemicals 8,000 tonnes of Benzene per annum (which is estimated to be its annual requirement) and to maintain this rate of supply for the next three years. HSL has further reported that the capacity of both the Bhilai and Rourkela plants was likely to be expanded by about 3,000 tonnes per annum each.

8.3.7. The Company has stated that its existing storage capacity for Butadiene was limited to 500 tonnes as it was not considered desirable or safe to store a larger quantity having regard to its hazardous nature and the need for refrigeration in storage. Its Alcohol storage capacity is reported to be of the order of 12,272.4 kilo litres and 1,227.2 kilo litres for Benzene.

8.3.8. All the suppliers of the principal raw materials in their evidence before us, maintained that the quality of the raw materials supplied to the producers of SBR conformed in every respect to the standards laid down by the Indian Standards Institution and were, by and large, comparable to the imported ones.

8.4. **Secondary raw materials:**

8.4.1. Rosin acid, conversion Catalysts, Reaction inhibitors and Extender oil are some of the important secondary items required in substantial quantities in the process of manufacture. These materials are stated to be locally unavailable and hence have to be imported. With the exception of Sodium nitrite which was obtained through the S.T.C., all other items were being imported directly by the Company.

8.4.2. The Company also informed us that owing to procedural difficulties in securing timely issue of import licences from preferred sources of supply, it had not been able to maintain inventories of some of the raw materials at the desirable level from the point of view of operational efficiency. This was particularly so in respect of Butadiene Catalysts. The consequent shortfalls in timely replenishment, they claimed, had adversely affected the scheduled replacement of used Catalysts and thus the efficiencies of conversion.

8.4.2.1. In the case of indigenous raw materials, the Company is stated to have experienced considerable difficulties in respect of supply of Fatty acid, Rangolite, Hydrosulphite, Phosphoric acid, Sodium nitrite, Caustic potash, Caustic soda and Soda ash, from time to time during the past few years. This too, it maintained, had in some cases affected its production schedules. The Company has also voiced concern about the poor quality of some of the indigenously manufactured secondary raw materials such as—

1. Acinol—Lals
2. Aluminium Chloride
3. Hydrated Lime
4. Nonox-D
5. Nonox SP
6. SDMDC
7. Fatty Acid
8. Hydrosulphite
9. Rangolite
10. Ferrous Sulphate

This had resulted in higher consumption of these items per unit of finished rubber, besides causing frequent process upsets and, consequently, losses in production. While it has not been possible for us to go into these complaints in any depth, we would like to draw the attention of the suppliers to it. *We do hope that wherever necessary effective and prompt steps would be taken by them to remedy such defects and to ensure that the products so supplied, fully conform to the I.S.I. or other well-recognised Standard Specifications.*

8.5. **Consumable Stores:**

We understand from the Company that it has not experienced any difficulty in getting requisite supplies of these stores from indigenous sources.

8.6. **Power and Fuel:**

The principal item of fuel required by the Company for generating steam is coal and it has been obtaining its requirement without any particular difficulty.

9.1. **Process of Manufacture:**

9. **Process of manufacture and By-products**

9.1.1. The process employed is Alcohol based and latex making is by the emulsion process. This process essentially comprises four basic operations, namely—

(i) manufacture of Styrene monomer;
(ii) manufacture of Butadiene monomer;
(iii) polymerisation of Styrene and Butadiene into Latex; and
(iv) coagulation of Latex into Rubber.

The salient features of these operations are briefly outlined below:

9.1.2. **Manufacture of Styrene monomer.**—In this process Alcohol is first dehydrated into Ethylene by passing vapours of Ethyl Alcohol over a Catalyst. The resulting Ethylene is converted into Ethyl Benzene called "Alkylate" (Friedel-Crafts reaction) in a special type of reactor called Alkylator. The emerging Alkylate consists of Ethyl Benzene, Diethyl Benzene, un-reacted Benzene and some residues. The crude Alkylate is separated from the side products and purified into Ethyl Benzene by distillation. Thereafter Ethyl Benzene is catalytically de-hydrogenated into Styrene by mixing it with steam at high temperature in the presence of a Styrene Catalyst. The resulting crude Styrene is purified by vacuum distillation. The residue, mainly "Bentol", an oleaginous mixture of Benzene and Toluene is further differentiated by fractional distillation and condensation. The resultant Benzene is mostly used internally for Styrene production, and the Toluene marketed as a by-product. At times "Bentol" itself is disposed of as such.

9.1.3. **Manufacture of Butadiene monomer.**—This is a closely integrated plant and is continuously operated all round the clock. Alcohol is catalytically oxidised to Acetaldehyde which is reacted hot with more Alcohol in the presence of a de-hydration Catalyst to form Butadiene. In addition to Butadiene, certain other gases and oils are also formed. Butadiene is separated from these products and is suitably purified by absorption and distillation before it is passed on to the polymerisation plant.

9.1.4. **Polymerisation of Styrene and Butadiene into Latex.**—Liquid Butadiene under pressure and Styrene in a previously set ratio, are first pumped into a premixing stirrer tank and chilled by external ammonia refrigeration to the desired temperature. At the same time the Fatty acid and Rosin acid soap solution containing required salts and activators and Redox Catalysts are metered into the latex reactors. In these reactors co-polymerisation of Butadiene and Styrene takes place on a continuing basis, the reaction mixture passing from one reactor to the next one in a series of several reactors. The Catalyst is added at two or three stages in incremental quantities by special pumping arrangements to keep alive and control the speed of reaction. At the end of the run conversion of Butadiene and Styrene into Synthetic Rubber of correct specification is reached at a conversion rate of 60 per cent. At this point the reaction is stopped by injection of short stopping agent which destroys the active Catalyst. There is also mechanism to inject a medium solution at two or three intermediate points so as to control the molecular weight of Rubber. Throughout the polymerisation process the operating temperature inside the reactor has to be maintained at $+5°C$. This necessitates refrigeration under normal Indian conditions. The unreacted monomers *i.e.* Butadiene and Styrene are then stripped off from the latex emulsion by vacuum and steam stripping and the resulting Latex is then pumped into storage tanks for later coagulation.

9.1.5. **Coagulation of Latex into Rubber.**—As mentioned above the polymer thus obtained is first freed from unreacted monomers which are recovered. This

pure Latex is then continuously blended with antioxidant and oil solutions of proper grades and then coagulated in the presence of brine and acid in the coagulation tank which is highly agitated. After coagulation the formed Rubber is washed to remove the remnants of acid and brine. The raw Rubber is then extruded through a mill to reduce its water content to about 10 to 12 per cent. Thereafter the Rubber crumbs are blown into the drier which consists of a stainless steel conveyor apron moving through an insulated and air heated enclosure. After this heating/drying arrangement, water content of Rubber is reduced to less than 0.5 per cent. The dried lumps of Rubber are then transferred to an auto baler through a pneumatic conveyor system. The auto baler accumulates about 32 kgs. of Rubber in a weigh hopper and then compresses these into a bale by hydraulic pressure. The bales then move on to a roller conveyor where metallic impurities are removed electromagnetically. After testing, the bales are packed.

9.1.6. The Butadiene Styrene ratio is generally maintained at about 75 : 25 by weight in order to achieve optimum elastic and mechanical properties of the polymer. An increase in the Styrene percentage improves the elasticity and workability of the copolymer and this product is used for producing other types of high Styrene Rubber products.

9.1.7. While making Oil Extended Rubber steam process is used except that at the coagulating stage oil emulsion in correct proportion is first blended with Latex and then the Rubber is coagulated. Rubber grade 1958 is made by making a hot Latex using some 85 : 15 parts of Styrene and Butadiene and substantially blending this high Styrene Latex with almost and equal proportion of cold Latex suitable for making 1502 Rubber. This blend is then coagulated in the usual way to crumbs of Rubber and baled either in the form of loose crumbs or special bales.

9.2. **By-products :**

9.2.1. The main by-products recovered by the Company in the process of manufacture of Styrene are Toluene and

Bentol (containing 60 per cent Benzene and 40 per cent Toluene). These are recovered at present only in small quantities. We understand from the Company that the by-product Toluene is sold to rubber producers for manufacturing cement and when there is no adequate demand it is used as fuel. Details of the actual quantities of these by-products so far recovered annually and the amounts realised from their sales are given in Table No. 9.1.

TABLE NO. 9.1

Sales of By-products, 1968 *to* 1970

Years	Toluene			Bentol		
	Qty./ kl.	Rs./ lakhs	Rs./ Lit.	Qty./ kl.	Rs./ lakhs	Rs./ Lit.
1968 . .	314.90	4.97	1.58	24.35	0.54	2.21
1969 . .	190.48	2.81	1.47	2.58	0.05	1.94
1970 . .	417.90	4.18	1.00	77.62	0.63	0.82

9.2.2. It would be seen from the above Table that there has been a sharp fall in the Unit value of both the by-products. According to the Company, the difference in value realisation of Toluene is due to varying rates in different areas as indicated in the Table No. 9.2 below. Secondly its sales, in the past, were effected mostly from Bombay/Delhi/Calcutta/Madras warehouses. Now most of the sales are ex-Bareilly and Delhi.

TABLE NO. 9.2

Toluene prices in Rs. per litre

Year	Naked ex-Bareilly	Ex-Godown in drums				Cost of drum
		Ex-Delhi	Ex-Calcutta	Ex-Bombay	Ex-Madras	
1. 1968 . .	1.20	2.15	2.25	2.30	2.45	Rs. 65 upto 20th August, Rs. 70 from thereon. No change in Ex-godown price.
2. 1969 upto March.	1.20	2.15	2.25	2.30	2.45	Rs. 70 per drum
3. 1969 from April.	0.80	1.85	1.95	2.00	2.15	
4. 1970 . .	0.80	1.85	1.95	2.00	2.15	Rs. 70 upto Feb. 18th, Rs. 85 upto Sept. and Rs. 95 from October.
5. 1971 as of July 6th.	0.80	1.85	1.95	2.00	2.15	Rs. 90 w.e.f. March.

NOTE.—Bareilly prices are excluding Excise and drum cost. Other prices ex-godown are inclusive of Excise and drum.

9.2.3. The other by-product recoverable is Ethyl Ether. During the period of severe Alcohol shortages in 1967-1968 and 1968-1969, a greater part of it was recovered for substituting Alcohol for Ethylene in the Styrene plant. It is however not altogether suitable as a substitute because of the presence of impurities which adversely affect alkylation. Moreover its use for the purpose renders the process uneconomic. Now that Alcohol is more freely available, Ether is mostly being used as a fuel by the factory.

9.2.4. Another co-product of the Styrene plant which is of considerable use to the Chemical Industry is Ethyl Benzene. It is however recovered in negligible quantities. Acetaldehyde another intermediate product of Butadiene plant, is another versatile raw material. It is presently mostly used as a denaturant of Ethyl Alcohol. We understand, however, that it has considerable potential for development as a raw material for the manufacture of several other products.

9.2.5. **Quality Control.**—The Company has claimed that it has well equipped laboratories manned by senior chemists well trained in the various operations essential for quality control. According to the Company, quality control is initiated at the stage of raw materials and is continued at every stage of manufacture thereafter. For this purpose samples are regularly drawn at almost every stage and frequently checked. This enables early detection of any defects developing during the process and timely remedial measures, thus safeguarding the quality of the finished product. The quality of the finished Rubber bale is also constantly checked. Adequate records are also maintained whereby it would be possible to analyse the results obtained on a batch to batch or shift to shift basis. The Company has informed us that it had discontinued the practice, which was in vogue in the earlier years, of sending samples to M/s. Firestone plants in the U.S.A., for independent quality control reports. However, whenever any major change was made in substituting an important key raw material such as Rosin acid or Extender Oil modifiers etc., the practice of sending the first samples to the Firestones for quality clearance, was still in force.

10.1. **Technical Know-how :**

10. Technical know-how and Technical Service

We understand from the Company that it was receiving all assistance from M/s. Firestone Tire and Rubber Co., Akron, Ohio, U.S.A. in regard to the running and operation of the plant at Bareilly. The detailed particulars of the the Technical know-how available to

Company on the normal basis as reported to us are briefly summarised below :—

(a) Testing and approval of any of the raw materials imported whenever required ;

(b) Assisting in obtaining supplies of materials from approved sources whenever requested ;

(c) Testing of rubber products for any defects in quality or in regard to any deficiency in operations ;

(d) Providing their technical men whenever required or asked for ;

(e) Providing technical information on the manufacture of S-1958. This was not originally included in respect of the three Rubbers *viz.*, S-1500, S-1502 and S-1712 ;

(f) Providing training facilities to the Company's technicians in their plants in Akron, Lake Charles and others for a period of 2-3 months at a stretch, and allowing them to work on operations at these plants for SBR technology ;

(g) Co-ordinating assistance with Union Carbide and Chemische Werke Huls, whose technologies had been adopted on the Butadiene and Styrene plants, as also arranging for the training of the Company's technical men in the Styrene plant whenever requested ;

(h) Providing critical evaluation and comments on the application work connected with the use of SR in different end-products.

The Company has stated that there has been no significant change in the emulsion SBR technology for many years because of the change over to the solution process and the Zeigler technology. As such, in practice there has not been much flow of new technological data from M/s Firestone.

10.2. **Technical Service :**

For promoting sales of SBR, a product which is relatively new to the Indian market, the provision of technical service plays a very vital part. Prior to the commissioning of the

plant the consumption of SBRs was restricted only to a few selected Tyre Companies and Rubber products manufacturers. As a part of their market development programme the Company is reported to have established a well equipped technical service laboratory at Bombay manned by highly qualified technologists. The purposes of the technical service are to :—

(i) Develop products containing maximum and optimum percentage of SBR to enable the customers to derive full benefit by being able to duplicate the compounds ;

(ii) Offer free expert training in the science of compounding of rubber or manufacture of new rubber products to rubber technologists from all over the country ;

(iii) Promote import substitution as much as possible ; and

(iv) Establish standards both for the method of testing and specifications of the finished products for Defence and civilian use in conjunction with the Indian Standards Institution and International Standards Organisations and other technological Institutes including Government Agencies.

11. **Standards and Quality.**

11.1. **Standards :**

The Indian Standards Institution has published recently IS-5188-1969 for cold polymerised raw SBR and IS-5188-69 for cold polymerised extended raw SBR. M/s. Synthetics and Chemicals Limited have informed us that they have adopted the International standard specifications for the various grades of rubber and these are well covered by the I.S.I. specifications.

11.2. **Quality :**

During the public inquiry, general consensus of opinion was that the indigenous SBR that was available in various grades in the market was by and large of acceptable quality

which compared well with the imported product. Almost all the consumers have, however, expressed dissatisfaction about the present quality of packing. Representatives of the Consumer Association also drew pointed attention to the frequent variations in the weight of the bales. One Tyre manufacturer has stated that the indigenous SBR was deficient in consistency and cold flow. According to a footwear fabricator S-1958 grade of indigenous SBR contains hardly 50 per cent of high Styrene whereas the imported material like Duranit-B has about 60 per cent of high Styrene. Complaints have also been received about the difficulty experienced in the identification of polymer bale once the paper bag was removed.

11.2.1. The Company contended that its design factor provided for 0.5 to 1 per cent error in the recording of weight. In actual practice it was somewhat higher than this. Nonetheless it has informed us that considerable research was being done with the suppliers of laminated multiwall paper bags to improve their construction as also on film or extrusion lamination to improve the quality of adhesion during melt-coating. It has also averred that it provided technical assistance to its customers. It further proposed to equip the plant with automatic film wrapping and packaging machines so as to seal the bales of Rubber and to provide these with a sealing cover to prevent external contamination in the event of damage to the bags during storage or transit. Pending import of the automatic film wrapping machine, the Company is stated to be making alternate arrangements to provide coloured poly-ethylene lamination to the multiwall bags to overcome the problem of identification at the consumer plant. *We are, however, disappointed to note such frequent variations in the recording of weight in a highly sophisticated plant like this. We hope every effort would be made by the Company to remedy this draw back.*

12. Researh & Development.

12.1. The basic objective of research in any industry is to promote the development of technology and bridge the existing gap between research undertaken at the laboratory level and its industrial utilisation. Research and development programme, therefore, deserves to be given top priority. We understand from the Company that due to

severe financial constraint it could hardly afford allocating any funds to the research and development programme. The major preoccupation so far had been optimisation of production and market expansion. In the meantime it had been also engaged on a certain amount of import substitution work with the help of outside agencies. At present, the research and development programme of the Company is stated to be mainly directed to the following two fields of activity *viz.*, (i) development of new grades of SBR and (ii) import substitution programme. This is in addition to that of technical service which has been dealt with earlier in paragraph 10.2.

12.2. **Development of New grades of Rubber :**

12.2.1. The Company claims to have developed four new products, namely, S-1513, S-1514, emulsion poly-Butadiene Rubber and compounding Resins. The first three were stated to be undergoing market evaluation at present.

12.2.1.1. *S-1513.*—This is a low mooney, non-staining Rubber containing 40-45 per cent bound Styrene, resembling mostly NR. It has got shrinkage control properties. The Company claims to have marketed about 500-700 tons of this product. According to it, this product was gaining acceptance by the non-Tyre industry.

12.2.1.2. *S-1514.*—The Company has stated that this grade is similar to S-1513 but it is a high mooney product. Its processibility is similar to S-1513 but it has high tensile strength in which it approaches the levels of N. R. So far it had found only limited acceptance.

12.2.1.3. *Emulsion poly-Butadiene dry & Oil Extended Rubber.*—According to the Company, emulsion poly-Butadiene is a Rubber of some promise. Several of its properties are found to be quite attractive and an improvement over SBR. It is stated to be still under development as its keeping properties are not yet adequate due to absence of good anti-oxidant. In regard to emulsion poly-Butadiene Oil Extended Rubber, its keeping properties are stated to be much better. The Company has, however, stated that while it was intended mainly for Tyre making because of its good tack and abrasion

properties, most of the Tyre Companies had refused to test it out on the plea that their parent Companies did not recommend such grade of Rubber. It has, however, been accepted for camelback stock and some non-Tyre applications such as for making battery boxes. The market potential is placed at between 1000 to 2000 tonnes per year during the next two to three years if regular production of this grade is now undertaken.

12.2.1.4. *Compounding Resins.*—The Company has stated that the Rubber Industry uses the Resin powder for many applications. It has so far developed laboratory samples of the same and expected to produce larger samples for market evaluation in future. The Company has stated that it intended to undertake the development of Chlorex (B-B Dichloro Diethylether) required for refining of crude Butadiene, as well as Butadiene Catalysts A and B which, in its opinion, were quite critical for maintaining the tempo of production.

12.3. **Import Substitution Programme :**

We understand that considerable development effort has been made by the Company to substitute many products such as Fatty acid, Nonox-SP, Nonox-D powder (Wings SP), Ethyl Chloride; Pottassium Hydroxide, S.T.S. and Sodium Hydrosulphite which were being imported. As a result, its import bill is reported to have come down sharply inspite of the increasing scale of production. The two similar major programmes; now stated to be pending with the Company were the development of Rosin Acid and Extender oil. When these two get started, its import requirement according to the Company, was expected to be reduced to less than five per cent of the present raw materials inputs.

12.4. Notwithstanding the pioneering efforts of the Company to familarise its products amongst the various rubber goods manufacturers who claim to have a turnover close to Rs. 300 crores and to be manufacturing every conceivable item of such products, there does not exist in this country any Central Organisation for undertaking relevant research and development activity. It would be interesting to note in this connection that a wide variety of Research and Development

Institutes function abroad and while some of them are organised by Government, the others are sponsored and financed by the raw material and/or the finished products manufacturers. However, in India such activities are conspicuous by their absence. In circumstances such as those it is difficult to undertake a job of any real import to evaluate the progressive use of SBRs or for that matter of any raw material required by the Rubber Industry. The *I.R.M.R.A. which was set up about a decade back has yet to make a cognizable beginning in this direction and even if it does, it is doubtful if any sustained work on the Tyre industry problems could be undertaken in view of the apathy and reluctance of the concerned manufacturers to refer their problems to it.

12.4.1. We have carefully considered the views put forth by various interests regarding the need for setting up of a single Central Organisation for undertaking research and development activity relating to progressive usage of SBRs in the manufacture of passenger and truck Tyres. The existing Technical Service Laboratory of the Company, which no doubt renders useful service in this regard, does not possess the complex facilities required to try on its own the manufacture of a full-fledged Tyre and it has more often than not to depend upon the tender marcies of the Tyre industry to evaluate on a large scale the usage of SBRs in a Tyre. Consequently no extensive and reliable data on the usage of SBR in truck Tyres is available in this country. We feel that the appointment of a High Power National Body entrusted with the task of evaluating higher usage of SBRs in different items of manufacture, particularly in regard to its usage in the manufacture of passenger and truck Tyres, could serve a highly useful purpose and at the same time render an effective service to the entire Rubber Industry. *We, therefore, recommend that Government may consider the desirability of setting up a High Powered Body consisting of representatives from Government, the Industry as well as the manufacturers of Rubber goods and raw materials, entrusted with the task of evaluating higher usage of SBR in different items of manufacture, more particularly in regard to its utilisation in the manufacture of passenger truck Tyres.*

*Indian Rubber Manufacturers' Research Association

13. Selling System

13.1. Since its very inception in 1963 till 31st August 1970, marketing of the production of M/s. Synthetics & Chemicals Ltd., was carried out by its Sole Selling Agents M/s. Kilachand Devchand & Co., under an agreement entered with them. The Agency agreement is reported to have been terminated by the Company Law Board by its Order dated 6th July 1970. The suit filed against the Company by the Firestone Tyre & Rubber Company challenging the validity of the renewal of the Sole Selling Agency of M/s. Kilachand Devchand & Co. Pvt. Ltd., is reported to have been settled by the consent of the parties and Orders passed by the High Court on the terms of this settlement. As regards the future organisational set-up, we have been informed by the Company that the pattern of organisation and operations of the Sales Department now established would be more or less on the same lines as hitherto, the major difference being that instead of being under an Agency and being paid for on a commission basis, (at two per cent upto 31-10-1968, from 1-11-1968 to 31-3-1970 as per Court decision and from 1-4-1970 to 31st August 1970 on cost basis) it would function as a full-fledged department of the Company. The actual costs of selling and distribution would be booked accordingly.

13.1.1. The Sales organisation has its principal office at Bombay with regional offices at Calcutta, Delhi and Madras. Bombay has a regional Office as well. These regional offices are situated in close proximity to the main Rubber consuming areas. For the purpose of all-India sales the marketing responsibilities are allocated on the basis of the territories assigned to each regional office. There are also warehouses in each area for storing SBR with sufficient capacity to meet the demand for ex-warehouse supplies. 50 to 55 per cent of the total sales of the Company's products are reported to have been made through these warehouses.

13.1.2. The Selling Organisation looks after all the procedures and functions concerning market survey, procurement

of customers' orders, supplies from warehouses, storage etc. The main purpose of the market survey are :—

(i) collection of data on a continuous basis, from actual users regarding their present and projected consumption of various grades of N.R. and S.Rs.;

(ii) establishing through technical studies and practical demonstrations the possibility of maximising the use of SBR in Rubber blends for different uses;

(iii) analysis and forecasting the future growth of Rubber consumption; and

(iv) correlation of the data obtained in the course of technical examination to explore the possibilities of further extending the range of products in which SBR could be successfully used.

The data thus collected are processed and compiled for the purpose of production programming both on a short and long range basis. This department also attends to clearance of consignments/despatched from factory to the regional werehouses. It has evolved necessary procedures for the purpose of credit control and the supplies to different consumers are regulated accordingly.

13.1.3. The Company has also informed us that there were no other agencies apart from its own Selling Organisations, to look after the marketing of its products. The sales were made direct and no wholesalers or retailers were involved. Hence no commission, discount or other form of payment was allowed by the Company at any marketing stage or to any of its customers. Supplies were made to the customers either from Bareilly or from the regional warehouses. The orders were procured by the sales personnel directly from the customer and in case of supplies from the factory the relevant orders were forwarded to the principal office at Bombay which in turn cross mandated these to the factory for execution.

13.2. **Sales and Stocks:**

Figures of the sales of the Company as well as the stocks of SBR held by it at the end of every year since 1963 are given in the Table below :—

TABLE NO. 13.1

Sales and Stocks

Year	Sales during		Stocks at the end of	
	Quantity (Tonnes)	Value ('000 Rs.)	Quantity (Tonnes)	Value ('000 Rs.)
1963 . .	2,273	9,372	5,665	21,988
1964 . .	10,982	43,716	7,323	27,418
1965 . .	13,089	74,399	4,737	18,361
1966 . .	18,785	84,349	1,510	5,952
1967 . .	20,540	99,312	2,396	10,652
1968 . .	22,767	121,049	4,743	22,836
1969 . .	26,170	139,226	3,218	13,818
1970 . .	27,769	128,200	5,706	22,689

It would be seen from the above Table that the sales of the Company have registered a rising trend. From a mere 2273 tonnes in 1963, the 1970 sales touched a record figure of 27749 tonnes. Stocks have varied having regard to the production and demand position.

13.2.1. The break-up of the sales from 1966 to 1970 to Tyre and non-Tyre sectors, is given in the following Table.

TABLE NO. 13.2

Sales of SBR to Tyre and non-Tyre sectors during the years 1966 to 1970

(Tonnes)

A. *Auto Tyres*	1966	1967	1968	1969	1970	Percentage increase of 1970 over 1966.
1. Firestone . . .	3,050	2,181*	1,845*	3,525	3,724	
2. Ceat . . .	775	1,655	1,985	2,147	1,539**	
3. Dunlops . . .	5,750	6,610	5,876	5,675	5,690@	
4. Inchek . . .	230	469	797	847	711@	
5. Goodyear . . .	1,230	1,882	2,224	2,554	1,440†	
6. M.R.F. . . .	1,230	1,056	1,197	1,690	2,447	
7. Premier . . .	185	449	505*	611	612£	
Sub-total . . .	12,450	14,302	14,429	17,049	16,163	130 (6·8%)
B. *Others*						
1. Footwear . . .	3,825	4,000	5,265	5,410	5,920	
2. Cycle Tyres & Tubes (Other than 'A' above).	900	800	800	1,006	1,905	
3. Retreading material (Other than 'A' above).	200	180	220	415	904	
4. Industrial Rubber Products . . .	975	700	900	1,010	1,272	
5. Others. . . .	435	558	1,113	1,280	1,585	
Sub-total . . .	6,335	6,238	8,298	9,121	11,586	183 (16.3%)
GRAND TOTAL . .	18,785	20,540	22,727	26,170	27,749	148 (10.3%)

NOTE:—*Low consumption because of in-operation due to strike.
**Low consumption due to four months' strike.
@Low consumption due to labour trouble.
†Low consumption due to 2½ months strike.
£Low consumption due to stoppage of production of camelback.
Figures in bracket represent compound rate of growth per annum.

13.2.1.2. It would be seen from Table No. 13.2 *that the use of SBR by non-Tyre sector has nearly doubled itself during the period under reference. This means a compound rate of growth of* 16.3 *per cent per annum. The usage in Tyre-sector has increased at a lower rate being of the order of only* 6.8 *per cent compound rate of growth per annum in the aggregate.* It would also be observed that bulk of this increased offtake is accounted for by the four smaller and newer tyre manufacturers who have, taken together, more than doubled their consumption during this quinquennium.

13.3. The consuming industries in general have expressed satisfaction about the distribution system currently in force. Almost all the consumers as well as their Associations, were unanimous in their view that the supply position was satisfactory and the consuming industries got their requirements regularly and in adequate quantities.

14. Selling Prices

14.1. **Domestic Prices of SBR :**

14.1.1. As referred to in paragraph 1.2, before the imposition of Statutory price control with effect from December 1969, Government have been fixing informally the selling price of the basic SBR types 1500 from time to time. The prices of other types were derived from it. The following prices were thus operative for the periods as indicated in the Table below :—

TABLE NO. 14.1

Selling Prices of S-1500

Effective date	Price (Rs./kg.)
Prior to October, 1963	4.40
1st October, 1963	4.05
1st August, 1964	3.85
21st June, 1966	4.35
6th November, 1967	4.60
4th April, 1968	5.15

14.1.2. In seeking to support their case for a price increase the spokesmen of the manufacturers have averred that no increase above the opening level of Rs. 4.40 per kg. for SBR 1500 grade Rubbers, was allowed except during the period when Alcohol had to be imported at higher cost. In fact there were certain periods when this price ceiling had been brought down. On the other hand, they maintained that their production costs had risen in the meantime *i.e.*, since 1963, by about 80 per cent. They further contended that the current prices were unjustifiably low and therefore, uneconomic. As a result the Company was unable to bear the heavy financial burden. They added that this Industry had been singled out for price control from its very inception in consequence of which their overall financial position was much weaker as compared to that prevailing in many of the user industries and other newly established capital and technology intensive analogous industries like man-made fibres or drugs and pharmaceuticals.

14.1.3. It has been further maintained by them that a 10 per cent rise in SBR prices would only mean something less than a half per cent increase in the manufacturing cost of the end product. In support of this argument they have pointed out that when the total turnover of Rubber manufacturers amounted to as much as Rs. 300 crores a year, the total value of SBR supplied to them was of the order of only Rs. 15 crores per annum or approximately 5 per cent of their total output. They have added that SBR is regarded as the "workhorse" of the Rubber Industry just as steel is for the Engineering Industry. The Company claims to have saved Rs. 30 crores in foreign exchange due to this import substitution. Moreover, the setting up of this Industry has provided an outlet for surplus Alcohol and helped in the industrialisation of a backward region in the U.P., apart from thus contributing to the establishment and development of a relatively sophisticated Agro industry within the country.

14.1.4. The Company's representatives have further drawn our attention to the fact that in their opinion their present plant was uneconomic in size as compared to many other similar plants in operation elsewhere in the world. They would therefore like us to keep this also in mind while

making our recommendations. The point was also made that although the demand for. SBR was likely to increase at a steady rate even after SRs. like PBR were actually produced in India, the present Bareilly plant in all probability would have outrun its normal life expectancy by the end of the seventies or soon thereafter. Furthermore, it has been argued that an expansion in its case by another 20,000 tonnes or so *i.e.*, upto 50,000 tonnes, would cost only Rs. 4/5 crores by way of fresh outlay of capital as against a totally new plant of similar capacity which would cost Rs. 12/13 crores.

14.1.5. As we have had occasion to mention elsewhere, we find that inspite of the fact that Alcohol is made available to this Company at a relatively cheaper price as compared to imports, and even assuming the optimum production from the Butadiene and Styrene plants, its costs of manufacture of these basic intermediates leading to the synthesisation of SBR would work out higher than the cost of petro-Butadiene obtained as a by-product from the Naphtha Cracker. The fact is that the Alcohol process employed, as the Company's representatives have themselves admitted, was a totally outmoded one and the so-called technological exchange provided for in the 'Knowhow' Agreement was in fact a dead letter.

14.1.6. Moreover, as far as we have been able to understand it while a 30,000-40,000 tonnes size plant could be quite economic, if confined to the co-polymerising of the Latex and the Rubber making processes, the real economies of scale are in the manufacture of the intermediates *viz.*, Butadiene and Styrene. It is in this part of the total activities that plants of the size of 100,000 tonnes or more result in appreciable economies in the cost of production. Since in any case the establishment of a plant of such a size based on Alcohol was clearly out of the question, *we do not quite see any advantage in allowing an expansion of their present capacity at Bareilly over the present figure even when the local availability of Alcohol (about which we have been assured not only by the Company but by the Indian Sugar Mills Association as well) might support a limited expansion.* The fact is that this by itself would not take away the inherent diseconomies of the Alcohol-based process. On the

other hand, since Butadiene was difficult, expensive and hazardous to transport, there was little point in carrying petro-Butadiene all the way to Bareilly from its actual source of production.

14.1.7. Moreover, we find that the demand for Industrial Alcohol for other industrial products as well as for potable Alcohol, was on the increase. In any case, the domestic supplies of Alcohol were subject to fluctuations due to changing weather conditions and price situation in molasses, gur and sugarcane. In our view, therefore, *it would be unsafe to rely on the continued availability of cheap domestic Alcohol to sustain substantial additions to capacity. As to what should be done to replace and expand the existing capacity of SBRs by the end of* 1980 *or so, would be a matter which we feel sure, would be receiving the attention of Government in the overall context of NR and SR requirement in our developing economy.*

14.1.8. As regards the apparent savings in foreign exchange, the Company has furnished details as given in Appendix VII.

14.1.9. The Company has stated that under the present conditions of inflationery economy when the prices of raw materials and other costs keep progressively rising and which factors are beyond the control of the Company, it would be very difficult to work out any system for stabilising the selling prices. Furthermore, it has been averred that the restrictive assumptions made all these years in the fixation of price of its SBR by Government such as an escalation of only three per cent on raw materials, five per cent on wages and salaries and three per cent every alternate year on coal, if amended to more realistic levels of five per cent for raw materials and coal every year and ten per cent for wages and salaries would, to some extent, help to absorb some of these unpredictable increases and thus assist the Company to hold the prices at a level for a reasonable period of time.

14.2. Prices of NR Vis-a-Vis SBRs.:

14.2.1. A comparative statement showing domestic and foreign prices of NR and SBRs during the first quarter of 1971 is given in the following Table:

TABLE NO. 14.2

Domestic and Foreign Prices of NR and S-1500/1502 and S-1712 during the first quarter of 1971

Rs./kg

Country	Types of Rubber		Difference of Col. (2) and Col. (3) as per-centage of Col. (2)	S-1712
	N.R.	S-1500/1502		
(1)	(2)	(3)	(4)	(5)
1. U.S.A. . . .	4.25	3.30	22.3	2.64
2. U. K. . . .	4.07	3.40	16.5	2.75*
3. W. Germany .	N.A.	2.93	..	2.40@
4. Japan . . .	N.A.	..	..	2.44
5. Singapore . .	3.81	N.A.	..	N.A.
6. Ceylon . . .	3.05	N.A.	..	N.A.
7. India . . .	5.20 (R.M.A.-1)	4.40	15.4	3.90

NOTES (i) Foreign prices for SER's are taken from British Chemical Weekly dated 8th April 1971 and those for NR are worked out from the Rubber Statistical Bulletin March 1971.

(ii) Value in Rupee is a converted figure, from 'Cents'.

*Ex-U.K. Port only.

@ Ex-German Port only.

14.2.1.1. It would be seen from Table No. 14.2 that the indigenous controlled price for S-1500/1502 is currently well below the minimum price fixed by Government for R.M.A.-1 Grade of NR since in practice, we understand, the market price fetched by NR in India is somewhat lower than the

floor, the actual price disparity would be lesser than that indicated by the figures quoted above. As regards foreign prices, disparities between NR and SR are also discernible. It would be also relevant to note that *in the developed world markets, SBRs sell at a discount of approximately* 16.5 *to 22.4 per cent over NRs,* while India being a major producer of NR and a minor one of SBR, the *inter se* price parities could reasonably be expected to be somewhat different. However, *we were informed by some of the users especially the Tyre manufacturers, that the use of SBR involves some extra processing cost of the order of 5 per cent or so as compared to NR for the same type of application. Hence, other things being equal, they would expect SBR to sell at about 5 per cent lower than the prevailing market price of NR.* As against this the relative price stability and certain technical as well as economic advantages (by way of supplemental, readily and regularly available domestic supplies) involved in the use of SBR as a substitute for NR have also to be kept in view.

14.2.1.2. As regards the domestic SBR prices being higher than the corresponding prices of foreign SBR, the Company has contended that the official rates of exchange do not reflect the true extent of inflation of the cost structure in India compared to the foreign exporting countries. It has claimed that if foreign prices were converted into Rupees at the free rates of exchange prevailing in the free market countries like Hong Kong, there would be hardly any difference between the domestic and import prices of SBR. Such a comparison is, in our view, fundamentally fallacious and obviously untenable as actual transactions have to be invariably made at the official par values.

15.1. **Import Trade Control Policy:**

15. Import Trade Control, Imports and Government Levies

SBR Synthetic Rubber is laid down under item 150—Part IV of the Hand-book on Import Trade Control Policy. According to this policy, imports of SBR and/or Alkyl substituted Styrene, Butadiene, Elastomeric Copolymers and Reclaimed Rubber are not allowed. However, imports of other SRs. namely Butyl Rubber, Acrylo Nitrile, Butadiene Copolymer,

Poly-Chloroprene Thikol, Poly-Isoprene, Poly-Butadiene, Hypalon, Silicon Rubber, Synthetic Latex including Vinyal Pyridine Latex, Co-polymer of Styrene Butadiene Latex, and hot type special grades of SBR for manufacture of high impact Polystyrene are alone permitted for actual users through a public sector importing agency. This policy has been in vogue for the last six years.

15.2. **Imports :**

The following Table indicates the imports of SRs. (other than SBR and/or Alkyl substituted Styrene Butadiene Elastomeric Copolymers and Reclaimed Rubber) in terms of quantity and value for the years 1965-66 to 1970-71 (April-September) along with the C.I.F. value per kg. worked out therefrom.

TABLE NO. 15.1

Imports of Synthetic Rubber (other than SBR and its Alkyl substituted Co-polymers) during 1965-66 *to* 1970-71

Year	Quantity (Tonnes)	Value (Rs. '000)	C.I.F. value in Rs./kg.
1965-66 . . .	3,237	10,876	3.36
1966-67 . . .	5,857	23,557	4.02
1967-68 . . .	2,852	15,967	5.60
1968-69 . . .	2,427	13,863	5.71
1969-70 . . .	4,149	21,496	5.18
*1970-71 (April-Sept.)	2,970	16,265	5.48

(*Source* : D.G.T.D.)

*Figures taken from the Monthly Statistics of Foreign Trade of India.

The Table No. 15.1 indicates that the average compound rate of increase in imports of SRs (other than SBR and/or Alkyl substituted Styrene Butadiene Elastomeric Copolymers) during the last four years was about 10.6 per cent per annum, while the average rate of increase in the C.I.F. value during the corresponding period was of the order of 10.3 per cent per annum.

15.3. **Government levies :**

The Company has stated that its finished stock is subjected to various Central and State levies. The detailed particulars of these are given below :—

15.3.1. **Central Levies :**

15.3.1.1. *Customs duty.*—Custom duty leviable under item 39 of I.C.T. specified in the First Schedule to the Indian Tariff Act, 1934 on SR was revised from 20 per cent *ad valorem* to 40 per cent *ad valorem* in September 1965 and was effective upto 6th June 1966. Thereafter it was reduced to 27½ per cent *ad valorem* and remained effective upto 28-5-1971. It has been again revised upward to 40 per cent *ad valorem* with effect from 29th May 1971. The present rate of Customs duty on SBR is 40 per cent *ad valorem* plus Rs. 300 per tonne as countervailing duty introduced since 1-3-1970. Regulatory duty of 10 per cent was introduced from 17-2-1965 and was effective upto 5-8-1966. Surcharge of 10 per cent was levied from 1-3-1963 and was effective upto 19-8-1965.

15.3.1.2. *Central Excise Duty.*—SR came under the Central Excise perview from 1-3-1970. The present rate of duty leviable under item 16 A.A. of Central Excise Tariff is Rs. 300 per tonne. This duty has remained unchanged since its introduction in March 1970. The Company has stated that Excise duty is levied on Benzene and also on the by-product Toluene (under item 6, SL. No. 11 of Central Excise Tariff) at Rs. 920/- per kilo litre. While no State excise duty is being paid by the Company on Alcohol and Styrene monomer it is stated to be paying administrative charges at the rate of Rs. 7.50 per kilo litre in respect of the former. Petro-Butadiene, however, is exempted from Central excise duty. For the purpose of Excise levy, SBR Latex is classified along with the SBR under item 16 A.A. of Central Excise Tariff. According to the Notification No. 29/70-CEX, dated 1-3-1970, SR Latex including pre-Vulcanised SR Latex is exempt from payment of duty as in excess of the duty calculated on the basis of the weight of the total solids content thereof.

15.3.2. **Central Sales Tax.**—The Company has informed us that it pays three per cent inter-State Sales Tax against 'C' Form and ten per cent without 'C' Form. It does not pay any cess and other levies.

15.3.3. **State Sales Tax.**—This is paid according to the Company, on rubber sold within the U.P. State and in the main cities at the following rates :—

U.P. State	With Form	Nil	
	Without Form	3%	
Bombay	With Form	2%	
	Without Form	6%	
Calcutta	With Form	1%	(Tyre Cos. Exempted)
	Without Form	6%	
Delhi	With Form	Nil	
	Without Form	5%	
Madras	On all sales	3%	

15. Exports and their Future prospects

16.1. No export of SBR from the country has been made so far.

16.2. As regards the future prospects of exports, the Company has informed us that the indigenous demand being somewhat lower than the present capacity, it expects to have a small exportable surplus for the next few years. It has averred that the possibility of exports would depend upon the quantum of reasonable incentives granted for the same. The Company is reportedly negotiating for such incentives with the Goverment of India through the Export Promotion Council. It was added that due to partial utilisation of capacity in the past the cost of production was very high as compared to the competitive world prices. Moreover, the Company had a general understanding with the Government that since the country needed imports of NR to meet the domestic demand, it would not be advisable to export SBR. It has further stated that while the emphasis in Government policy on export promotion had now changed, any large surplus capacity at its present level of production was not possible. Hence it could not visualise exports except in a small quantity and only for a limited period.

16.3. **Assistance rendered in the Foreign Countries for Export promotion :**

Ploymer Corporation Ltd., Ontario, Canada has stated that no Government assistance was extended to

the Industry for the development or to promote export of & Rs. Similar position obtains also in the U.K. and East Germany.

17.1. **Introduction :**

17. Cost of Production and Future Estimates

17.1.1. In the earlier portions of this Report we have dealt with the origin and historical development of production of the SBRs, especially in India, the main process of manufacture as well as the principal raw materials used therein. We have also had occasion to discuss briefly the constitution of the Company, its broad financial structure, the prevailing arrangements for technical collaboration as well as those for marketing its products. In the succeeding paragraphs we shall confine our attention to the cost aspects of the matter and seek to develop estimates as regards future costs and make our recommendations as to the fair prices payable for the period ending December 1973.

17.1.2. Our Cost Accounts Division has undertaken a detailed cost analysis on the basis of the data presented by the Company, who have an elaborate cost accounting system, for the years 1968 and 1969 for which audited accounts were available. We have also obtained from the Company similar data for the year ending December 1970, its own estimates of future costs as projections of the 1970 figures, as well as in some matters like production and actual costs of certain raw materials, even later data leading up to May 1971. We have also examined the Profit and Loss Accounts, Balance sheets and Annual Reports including the latest (11th) one for the year ending December 1970. As mentioned earlier we have had intensive discussions with the Company's representatives with the able assistance of our Technical Adviser. We have also examined a number of documents such as the Collaboration agreement with M/s. Firestones, heads of agreements with M/s. NOCIL for the supply of Butadiene, arrangements with the workers and staff, applications to Government for expansion and several other pieces of such evidence. The discussions of these aspects and our own conclusions contained in the succeeding paragraphs are the result of this detailed study.

17.2. **Finance and Accounts:**

17.2.1. The authorised capital of the Company is Rs. 15 crores made up of 15 lakhs equity shares of Rs. 100/- each. Out of this, 5.75 lakh shares have been so far issued and subscribed. Except for the initial issue of shares worth Rs. 4.50 crores, the subsequent issues of the value of Rs. 1.25 crores were sold at a premium of Rs. 20/- per share and the premium amount so received amounted to Rs. 25.75 lakhs. 25 per cent of the total issued shares is held by the Firestone Tyre and Rubber Company, USA. Members and Associates of M/s. Kilachand Devchand & Co., taken together also hold a similar percentage (26%) of the issued capital. Thus these two major groups of shareholders between them have a controlling interest in the Company.

17.2.2. The Company's Balance Sheets and Profit and Loss Accounts showed a profit of Rs. 82.90 lakhs for the year 1968 and Rs. 178.94 lakhs for 1969 after providing an amount of Rs. 37.50 lakhs for Development Rebate Reserve. In 1970, the Company had earned a profit of Rs. 204.40 lakhs out of which Rs. 201 lakhs were transferred to Development Rebate Reserve. Sales during 1968, 1969 and 1970 amounted to Rs. 1210.49, Rs. 1392.26 and Rs. 1314.55 lakhs respectively. Reserves and surplus stood at Rs. 26.66 lakhs in 1968, Rs. 193.33 lakhs in 1969 and Rs. 365.25 lakhs in 1970. These include an amount of Rs. 25.75 lakhs received by way of premium on issue of shares as stated earlier. The Company declared a maiden dividend of Rs. 6/- per share in 1969 and Rs. 12/- per share in 1970. The amounts so distributed viz. Rs. 34.48 and Rs. 68.97 lakhs respectively were debited to the General Reserves.

17.2.3. The ratios between the average owned (i.e. equity) capital to borrowed (loan) capital, was 1 : 1.89 in 1968. This has changed to 1 : 0.73 in 1970. This indicates that the overall financial position of the Company has by now improved substantially.

17.2.4. M/s. Kilachand Devchand & Co. Pvt. Ltd., who were the promoters of the Company, also acted as the Sole Selling Agents of the concern from the beginning. For this

service they were being paid a selling commission at two per cent on the value of sales. The selling agreement with M/s. Kilachand Devchand & Co. expired with effect from 1st April 1970. Thereafter until 1st September 1970, the Company used the services of the selling organisation of M/s. Kilachand Devchand & Co., on an actual cost basis. The total payment to the Sole Selling Agents towards payment of commission etc. during the years from 1963 to September 1970 amounted to Rs. 102.59 lakhs.

17.2.5. M/s. Firestones with whose collaboration the Company had started, also initially arranged to provide a part of the foreign exchange required for making external purchases, including the purchase of know-how. The know-how fees are payable in ten equal annual instalments commencing from 1965. Another part of the foreign exchange requirements was secured by the Company as a long term loan from the U.S. International Development Agency. These arrangements have been discussed in somewhat greater detail in the following paragraphs.

17.2.6. The total sums hitherto paid to M/s. Firestones *i.e.* upto the end of 1970) towards technical know-how amounted to Rs. 128.25 lakhs, for interest on Dolkar loans Rs. 123.97 lakhs, and by way of interest on Rupee loans Rs. 14.21.

17.2.7. In terms of the agreement with M/s. Firestone Tire & Rubber Co., M/s. Synthetics and Chemicals have paid U.S. $ 1,000,000 to the foreign Collaborator to meet the expenses in connection with the work of designing, engineering, construction and start up service of the plant. A disclosure fee of $ 300,000 was also paid. The Company is also liable to pay a continuing know-how and technical service fee of U.S. $ 285,000 each year for a period of ten years after the synthetic plant went into production and met the guarantees. In consideration of this payment, the Company has been granted an irrevocable royalty free licence to manufacture, use and sell its products under Indian patents. This amount also includes any payments which M/s. Firestones would have to make to its Associates in providing the Styrene and Butadiene know-how. The first payment of this technical know-how fees fell

due in 1965. The Company has provided the necessary amounts to meet this requirement in its accounts for the years 1968, 1969 and 1970 as well as in the previous accounting years. It would therefore, appear that the last instalment of payment to M/s. Firestones under this head of technical know-how fees would fall in 1974.

17.3. **Capacity and Production :**

17.3.1. As already narrated in paragraph 9, there are four main production processes involved in the manufacture of SBR. The first process is the production of Styrene, the second that of Butadiene, the third Latex making and ultimately blending and coagulation of latices into Rubber, weighment and packing.

17.3.2. The volume of production attained by each of the plants viz., Styrene, Butadiene and Latex/Rubber making for the last three years together with the number of days worked during each of these years and the quantities of Extender oil used are contained in the following Table :—

TABLE NO. 17.1

Statement showing Capacity, Production and the percentage of utilisation of Capacity during the last three years

(In M. Tonnes)

Name of Materials	Present Annual Installed. Net Capacity	Production			Percentage of utilisation		
		1968	1969	1970	1968	1969	1970
1. Styrene	8,200	6,819	6,281	7,599	83	77	93
2. Butadiene	22,860	13,922	11,366	13,936	61	50	61
3. Latex	32,510	23,023	22,339	27,206	71	69	84
4. (a) Dry Rubber . .		13,842	12,897	16,248			
(b) Oil Extended Rubber .		11,347	11,693	14,090			
5. Total production . .	30,480	25,189	24,590	30,338	83	1	99.5
6. Extender oil used . .		3,459	3 552	4,348			
7. Ratio between Dry Rubber and Oil Extended Rubber .	60:40	55:45	51:49	54 :46			
8. Production in terms of Dry Rubber	30,480	22,051	21,005	26,427	72	69	87
9. No. of days worked . .		323	274	309			

17.3.2.1. In paragraphs 6.3.2. to 6.3.7. we have dwelt on the question of the net productive capacity of the plants at some length in arriving at our own estimates of the expected volume of future production. The mean figures as contained in Col. 2 of Table 6.3. have been therefore adopted for the distribution of overheads and other items in working out our estimates of future costs.

17.3.3. It remains to be pointed out in this connection that the Company, under the existing Government policy, could go in for actual production of upto 25 per cent more of the licensed capacity which in the present case is 30,000 tonnes per annum of Dry Rubber. Allowing for a reasonable period for maintenance and repairs required for the plant, *we take it that the future production of the Company could be safely estimated at* 35,000 *tonnes per annum (including oil extended Rubber) the basis of the pattern of production as existed in* 1970.

17.4. **Cost of Production:**

17.4.1. The main processes involved in the manufacture of S.B.R. have been explained earlier in paragraph 9. We have proceeded, following the Company's own pattern of cost accounts to determine separately the cost of the products emerging from each main process and thus built up by stages the cost of the end product. Incidentally this method enables determination of the cost of the Company's own production of Styrene and Butadiene.

17.4.2. **Raw Materials:**

17.4.2.1. As mentioned earlier, Alcohol and Benzene are the two principal raw materials required in the production of S.B.R. Until the middle of 1967, the Company was able to meet its entire requirements of Alcohol from indigenous sources. Subsequently however, on account of the shortfall in the production of sugarcane, there was considerable shortage of Alcohol in the country and it was not possible for the Company to get all its requirements from indigenous sources. Consequently, it approached Government for import of Alcohol to maintain production and the necessary import

licences were granted. The production of S.B.R. during 1967, 1968 and 1969 was thus kept up by the use of imported Alcohol to supplement the indigenous supplies, although the cost of such substitution was decidedly higher. On an average the cost at the Company's factory of imported Alcohol worked out to Rs. 948.11 per K/L as against the corresponding domestic cost of Rs. 348.80 per K/L in 1969. *This dependance on imports is no longer necessary. We have been assured both by the Company and the Indian Sugar Mills' Association that local Alcohol supplies would present no problem even for the proposed expansion of the plant capacity.*

17.4.2.2. As previously indicated bulk of the Company's requirements of Benzene is obtained from Bhilai and Rourkela. The Catalysts necessary for the various processes are imported. So also is Extender oil. Out of the various Chemicals used in production some are imported whilst several others are of indigenous origin.

17.4.3. **Labour and other Expenses:**

17.4.3.1. During 1970 the Company employed 1660 personnel in its factory in addition to 75 people employed in the Head Office at Bombay. This does not include sales staff numbering 88 employed in various centres after the selling organisation was taken over from the Sole Selling Agents as from 1-9-1970. Workers are paid monthly in graded scales. In addition to basic salary the workers are paid dearness allowance, overtime payment for extra work, dear food allowance and some other allowances like cycle allowance etc. Dearness allowance is calculated at 70 per cent of the basic salaries for the first Rs. 100/- and thereafter on a progressively diminishing scale with advances in the basic pay. During 1970 the average emoluments paid to an individual worker amounted to Rs. 302 per month; Rs. 939 per month being the corresponding figure for the supervisory establishment. The Company has entered into a labour agreement in May 1971, by which some extra benefits have been given to the workers. The total increase in expenditure consequent upon this agreement is about Rs. 9.66 lakhs per annum. These have been taken into account in estimating the future cost of labour.

17.4.3.2. It has been represented by the Company that the annual increase in respect of salaries and wages on account of the increment factor would be about 10 per cent. We are of the opinion that this is quite high as compared to the salary structure in other industries, and the limited scope available for this Industry to expand in the near foreseeable future. It is seen that wages and salaries alone account for 9 per cent of the Company's total cost of production. We have therefore limited the increase on account of increment to staff and workers to 5 per cent per annum, which we consider as normal.

17.4.3.3. As stated earlier, the Company maintains a satisfactory system of cost accounting and to the extent possible, labour and other direct expenses have been charged directly on the basis of the actual payment or usage. As for the costs of indirect labour engaged in the production of 'utilities' such as refrigeration, steam, electricity, etc., these have been apportioned to the various departments on the basis of the time taken at the different cost centres. Cost of utility departments has been ascertained separately and the expenses thereon charged to the various production departments in proportion to the usage.

17.4.3.4. We would now proceed to discuss the basis on which we have determined the future cost of production in respect of the major items of consumption.

17.4.4. **The Company's Estimates of the Future Cost of Production :**

17.4.4.1. The Company has furnished its estimates of the future cost of production separately for the years 1971 to 1973 in respect of each of the three varieties of SBR produced as detailed in Annexure I. In arriving at these estimates, it has provided for an increase in the price of Alcohol and Benzene at the rate of 3 per cent per year. NOCIL Butadiene has been estimated to reach a level of 2.40 paise per kg. by 1973. Rosin Acid, which is an imported item has been taken at 10 per cent increase over the 1970 level for 1971 and thereafter at 5 per cent more per annum. The prices of other raw materials have been assumed by the Company to be going up at the rate of 5 per cent per annum. These increases have

been pitched up at high levels without any proper justification. For reasons detailed in the later paragraphs, we have estimated the utilisation and price factors of the different items for the future price period on the annual production at 35,000 tonnes as against 24,000 tonnes visualised by the Company.

17.4.5. **Styrene :**

17.4.5.1. During 1968, 1969 and 1970 the production of Styrene was slightly more than the quantity required for the unit's own manufacturing purposes. Hence a small quantity of the output of this department was marketed by the Company at remunerative prices. The production and the quantity sold in respect of Styrene during these years is given below :—

TABLE NO. 17.2

Production and Sale of Styrene

(In Tonnes)

Year	Total production	Quantity sold	Percentage of sales to production
1968	6,819	491	7.2
1969	6,281	372	5.9
1970	7,599	454	6.0

For the reasons stated in paragraphs 6.2 and 6.3.7 we have taken 8250 tonnes as the future production of Styrene per annum for the price period.

17.4.5.2. As mentioned earlier, in the production of Styrene the main raw material used is rectified spirit (Alcohol) in addition to Benzene. Catalysts and Chemicals are also used in this process.

17.4.5.3. During the years 1968 and 1969 due to shortage of domestic Alcohol the Company had resorted to using certain quantities of Ether which is a by-product of its Butadiene

plant. We were however told that this leads to process inefficiency, as such Ether is required to be refined before being used in the Styrene plant for the manufacture of Ethylene. This raises comparative costs and therefore, Ether was used in partial replacement of Alcohol only when high cost imports was the other alternative. With the improvement in the supply position of indigenous Alcohol from 1970, Ether was no longer being so used.

17.4.5.4. The average purchased cost of indigenous Alcohol used in the manufacture worked out to Re. 0.486 per kg. in 1968, Re. 0.472 per kg. in 1969 and Re. 0.461 per kg. in 1970.

17.4.5.5. It was represented to us in this connection that in actual practice absolute Alcohol was not easily available. Hence Rectified Spirit was being used for production of Styrene. The strength of this spirit was about 95 per cent V/V in terms of pure Alcohol. However distilleries charged them the maximum price allowed under the Ethyl Alcohol (Price Control) Order and so an adjustment in the price factor should be made to compensate for this loss of strength.

17.4.5.6. It was also claimed that the maximum of Rs. 100/- per K. L. permitted under the same order should be allowed to the Company for molasses carrying charges. We find that the average molasses transport charges paid by the unit during 1968, 1969 and 1970 were Rs. 62.20, Rs. 63.40 and Rs. 55.84 per kilo litre respectively. There is thus no justification for allowing the maximum of Rs. 100/- per kilo litre for this item. We have therefore, allowed the average expenditure of the Company for 1970 for molasses transport charges with an additional increase of 5 per cent for probable increases in the price period. *We have thus arrived at the Alcohol price for the future at the controlled rate as per the Ethyl Alcohol (Price Control) Order except for the above adjustment.* This works out to Re. 0.411 per kg. of Alcohol used.

17.4.5.7. Although Benzene was ordinarily obtained from M/s. Hindustan Steel Ltd., since its supply position from this concern was found to be irregular, the Company had gone

in for purchase of some quantities from the I.O.C. Refinery at Baroda. It was observed that the price paid to the I.O.C. was higher than that charged by Hindustan Steel. Nevertheless it has been stated that to keep up the production of Styrene in the plant they have had to take recourse to an alternative source of supply. *Since it is seen from the evidence led that Hindustan Steel was capable of meeting the entire requirements of the Company, we have taken the delivered cost of such Benzene alone in our calculations of the future cost.* If however, for any totally unavoidable reasons, a sizeable quantity of Benzene has necessarily to be procured from the I.O.C. at a higher rate in the future, a corresponding upward adjustment may become necessary in the recommended fair price of Rubber. An escalation clause has accordingly been worked out as indicated in paragraph 17.4.16 to provide for this contingency.

17.4.5.8. The average consumption of Alcohol and Benzene per tonne of Styrene in 1968, 1969 and 1970, is given in the Table below along with the quantities estimated for the future. We have generally estimated the future usages at the 1970 level. We found that the usages were tending to stabilise as actual production approached established capacities. We hope that some further economies might be possible in actual practice. Nevertheless in the absence of any other firm or comparable data and in consultation with our Technical Adviser, we felt that it would be inadvisable to make any surmise on this account.

TABLE NO. 17.3

Average Consumption of Alcohol and Benzene

In Kgs. per tonne of Styrene

	1968		1969		1970	For future ending Dec. 1973
1. Alcohol	381.31	546.05	401.79	534.96	556.84	556.84
2. Ether (in place of Alcohol).	164.74		133.17		..	..
3. Benzene	936.93		902.89		914.19	914.19

17.4.5.9. *Catalysts.*—The main Catalysts used for reaction in the Styrene plant are "Shell" and "Filtrol". The life of these Catalysts mainly depended on the purity of the reactants. As the quality of Alcohol and Benzene used was not always the same, it was explained that the life of these Catalysts could not be precisely determined. In addition, these were imported items and their prices also tend to vary. The average charge in respect of each of these items on the unit cost of production, during 1968 to 1970, was as follows:

TABLE NO. 17.4

The average charge in respect of the Catalysts on the unit cost of Production during 1968 *to* 1970

Description of Catalyst	Value of Catalysts charged	Cost per tonne	Value of Catalysts charged	Cost per tonne	Value of Catalysts charged	Cost per tonne
Year . .	1968		1969		1970	..
Production M. tonnes.	6,819		6,281		7,599	..
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1. Catalyst Filtrol	15,322	2.25	19,145	3.05	22,883	3.01
2. Catalyst Shell	47,992	7.03	69,622	11.08	154,074	20.28
TOTAL. .	63,314	9.28	88,767	14.13	176,957	23.29

17.4.5.10. It would be observed from the above Table that the cost in respect of these Catalysts increased from Rs. 9.28 in 1968 to Rs. 23.29 in 1970 per tonne of Styrene produced thus showing an increase of 152 per cent in two years over the 1968 level. The variation was mainly on account of the increase in prices of these items and the progressive increase in the use of the higher priced Catalysts in the reaction vessels. The purchased price of Catalyst 'Filtrol' increased from 1968 to 1970 at a uniform rate of about 11 per cent per annum. The price of Catalyst Shell had gone

up between 1968 and 1969 by 76.64 per cent and between 1969 and 1970 by 3.80 per cent.

17.4.5.11. During the discussions we had with the representatives of the Company, we were told that owing to delays in licensing, allocation of foreign exchange and such other mainly procedural problems, the use of these Catalysts had to be extended over periods longer than those laid down by their technical collaboration. This led to a fall in operational efficiency. It was therefore suggested that we should provide for Catalysts at the higher value and for the designed usage time

17.4.5.12. We find that there had not been any perceptible effect on the quality of production during the previous years consequent upon the use of Catalysts for longer periods than the life shown to us as per the design specifications. We also feel that with experience some further economisation in the use of Catalysts is both possible and necessary having regard to their rising prices and the foreign exchange content thereof. We have consequently limited the expenditure under this head to the unit incidence of 1970 with the marginal addition of 5 per cent per annum, to allow for the increasing trend noticed in the import prices. We have thus provided at the rate of Rs. 25.62 per tonne of Styrene, in respect of Catalysts consumption.

17.4.5.13. The major Chemicals used in the Styrene plant, include Aluminium Chloride, Ethyl Chloride and T.B.C., in addition to small quantities of other items. The quantity used in respect of each of these Chemicals and the rate varied from time to time. The incidence on account of Chemicals consumed per tonne of Styrene amounted to Rs. 139.36 in 1968, Rs. 156.62 in 1969 and Rs. 139.21 in 1970. The higher impact in the unit cost in 1969 was on account of lower production. The Technical Experts consulted by us have gone into the details of the quantitative consumption in respect of these Chemicals and have determined the quantity of each of these items at the 1970 level in relation to production. We have accepted the latest available purchase prices in respect of these Chemicals and have also allowed thereto an increase of 2½ per cent per annum

over the 1970 price levels in respect of indigenous chemicals to take care of further probable price rises. Thus the incidence in respect of Chemicals has been determined at Rs. 186.85 per tonne of Styrene. Of this apparent increase of Rs. 47.64 per tonne the increase on account of Aluminium Chloride alone amounts to Rs. 44.90. This is because about 25.65 kgs. of this Chemical is used per tonne of Styrene and the latest price paid for it is Rs. 1.75 per kg. more than that paid in 1970.

17.4.6. **By-products :**

Bentol is obtained as a by-product in the production of Styrene. This is separated into Benzene and Toulene. Benzene is reused and Toulene is sold in the market. Due credit has been taken for the sale proceeds of Toluene in arriving at the cost of production of Styrene.

17.4.6.1. *Butadiene.*—The principal raw material used in the manufacture of Butadiene is denatured Alcohol. The average rate per kg. of indigenous denatured Alcohol used in the Butadiene plant during 1968, 1969 and 1970 worked out to Rs. 0.486, Rs. 0.474 and Rs. 0.461 respectively. For the future, however, we have based our figures on the Ethyl/ Alcohol Control Order (as also in the case of Styrene) and the rate thus worked out is Rs. 0.4172 per kg. The break-up thereof is shown in Annexure No. 2.

17.4.6.2. It is seen that on an average 2886 kgs. of Alcohol were required for the production of one tonne of Butadiene in 1968. In 1969, the consumption had come down to 2863 kgs. and in 1970, it further decreased to 2819.14 kgs. It would thus be observed that there has been a progressive reduction in the usage of Alcohol presumably due to some improvement in operational efficiency. We were informed that such efficiency is dependent at least in part on day-to-day Catalyst conditions and regeneration. While therefore some/further/improvement in this direction might be possible, for the reasons recorded in paragraph 17.4.5.8. We have adopted the 1970 figures viz. 2819.14 kgs. of Alcohol per tonne of Butadiene for our estimates.

17.4.6.3. The main Catalysts used in the Butadiene plant are Catalysts "A" and "B". The average charges in

respect of these items for 1968, 1969 and 1970 are given below :

Year	1968		1969		1970	
Production (tonnes)	13,922		11,366		13,936	
Description of Catalysts	Total value charged	Value per tonne	Total value charged	Value per tonne	Total value charged	Value per tonne
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Catalyst A	14,283	1.02	10,854	0.95	12,608	0.91
Catalyst B	3,20,374	23.01	366,088	32.21	641,178	46.01
TOTAL	3,34,657	24.03	376,942	33.16	653,786	46.92

Both these Catalysts are imported. It would be seen from the above that the increase in the cost has been primarily in respect of Catalyst 'B'. It was explained by the Company in this connection that the expense in respect of Catyalyst 'B' has been increasing year after year due to fresh inputs which were at a higher cost and that these were likely to be still higher in the future. It is seen that the price of Catalyst-B had risen between 1968 and 1970 by about 17 to 18 per cent over the 1968 price. The Company had been using Catalyst A during 1968 and 1969 from old stock. Fresh purchases had been made in 1970 of Catalyst A and these have also been showing a similar trend of increase in price. As explained earlier, the Company would have to go in for more effective and intensive utilisation of these Catalysts to at least partially offset the rise in prices of these imported items. Having regard to the upward trend in their prices, we have allowed in our future estimates an addition of 5 per cent per annum over the actual incidence noticed during 1970 and have thus determined the future cost under this head at Rs. 51.61 per tonne of Butadiene.

17.4.6.4. In regard to other Chemicals, the major items used are Lime, Chlorex and TBC. Certain other items like Caustic Soda are also used but in smaller quantities. During 1968, 1969 and 1970 the average expenditure under this head amounted to Rs. 25.40, Rs. 22.14 and Rs. 27.68 respectively per tonne of production thus showing in 1970 an increase of 9 per cent over 1968. In estimating the future consumption of Chemicals, we have, as stated earlier, followed the advice obtained from our Technical Experts and determined the quantitative consumption in respect of each of these items at the 1970 level, we have adopted the latest available purchase prices with an allowance of $2\frac{1}{2}$ per cent per annum for probable future increases in respect of indigenous Chemicals. The cost under Chemicals thus works out to Rs. 45.30 per tonne of production of Butadiene for the future.

17.4.6.5. The Table below shows a comparison of the average purchase prices of Butadiene from NOCIL during 1970, along with the manufacturing cost thereof in the Company's own plant for the same year.

	Rs./Kg.	
	NOCKIL Price	Own Cost
1. Price plus NOCIL fixed charges and Insurance	1.682	2.537
2. Central Sales Tax @ 3%	0.050	..
3. Transport Charges to Bareilly . . .	0.412	..
4. Octroi	0.004	..
5. Total (Delivered Cost).	2.148	2.537*

*Exclusive of Bonus and Interest and based on depreciation calculated on written down value method.

The cost of own manufacture is really comparable with Item No. 1 of the Table above. It would thus appear that inspite of improved performance the cost of self manufactured and Alcohol-based Butadiene (excluding profit and certain other elements) is higher than the ex-factory cost of NOCIL Butadiene.

17.4.6.6. We were told that the Company had to go in for NOCIL Butadiene from 1968 as there was a shortage of Alcohol supplies and it was found necessary to have a stand-by source as a hedge against bad monsoons. The Company has also contended that its own cost of manufacture would be comparable to the NOCIL prices, on the ground that the marginal cost concepts would then apply as the fixed charges of the plant were already being absorbed by the existing volume of production and the total of variables only need be therefore compared with the purchased prices. Such a view may not be wholly tenable. In any case the higher production cost for self generated Butadiene could at least in part, be attributed to (i) certain inherent drawbacks in the Alcohol-based process itself, petro-Butadiene being merely a by-product of Naphtha cracking, (ii) some of the defects in the plant itself including its age as well as (iii) the degree of underutilisation hitherto noticed. We are hoping that it would be possible for the Company to utilise its Butadiene capacity more fully in the coming years and thus effect some further reduction in cost.

17.4.6.7. The variation in the actual cost of production between 1968 to 1970 can be primarily attributed to the lower quantity of imported Alcohol content in 1969 as compared to 1968 and the absence of imported Alcohol in 1970. We have arrived at the future estimates on the basis of 100 per cent indigenous Alcohol. *We have also provided for an average purchase of* 5750 *tonnes per year from NOCIL in consideration of the long term agreement which the Company has entered into in this regard.* In computing the estimated cost of manufacture, we have taken the Company's own production to be of the order of 16,500 tonnes per annum, in addition to purchases from NOCIL as mentioned above.

17.4.6.8. We have adopted the average 1970 rate of Rs. 2.148 per kg. for purchased Butadiene in our estimates. We have also indicated an escalation clause thus providing for the apprehended contingency of an upward revision of petro-Butadiene prices following increases in crude prices.

17.4.6.9. Credit has been taken for residues obtained as a by-product in the Butadiene plant and used as fuel in arriving at the actual cost of Butadiene. The credit thus arrived at would be Rs. 52.80 per tonne of production in this department.

17.4.7. **Latex :**

17.4.7.1. The Company produces cold as well as hot Latex for the manufacture of SBR. During 1968, 1969 and 1970 production of cold and hot Latex together amounted to 23023, 22339 and 27206 tonnes respectively. The average consumption of Styrene and Butadiene per tonne of cold and hot Latex in the years 1968, 1969 and 1970 are given below :—

(Usage per Tonne of Latex in Kg.)

Name of the material	Cold Latex			Hot Latex		
	1968	1969	1970	1968	1969	1970
1. Styrene .	227.95	229.07	223.11	809.99	795.83	874.63
2. Butadiene .	693.03	702.43	703.55	122.86	120.91	123.72

It would be seen from the above Table that there are some variations in the usage of Styrene and Butadiene in these three years. This is stated to be essentially due to the variations in the product mix of Rubbers and on account of minor changes in the day to day operating conditions as a result of continuous blending of the two monomers. In arriving at the future estimates we have adopted the usage levels observed in 1970.

17.4.7.2. The actual cost of Chemicals consumed was Rs. 505.06, Rs. 455.18 and Rs. 478.26 per tonne of cold Latex in 1968, 1969 and 1970 respectively. The same amounted to Rs. 451.42 in 1968, Rs. 508.16 in 1969 and Rs. 411.32 in 1970 for hot Latex. For the future estimates, however, as for Styrene we have fixed the quantitative consumption at the 1970 levels and applied to these the latest purchase price plus a margin for anticipated further increase at 2½ per cent for indigenous chemicals in forecasting the expenditure under this head. The amount thus arrived at works out to Rs. 528.69 per tonne of cold Latex and Rs. 517.68 per tonne of hot Latex. These increases are mainly due to the rise by Rs. 1.15 per kg. in the price of Rosin acid and by about Rs. 2 per kg. for Fatty acid, both of which are used in sizeable quantities in these processes.

17.4.8. **Rubber :**

17.4.8.1. As stated earlier, the production of SBR can be broadly classified under three major varieties viz. S-1500/ S-1502, S-1712 (OE) and S-1958. The actual production in respect of each of these varieties has been shown in paragraph 17.3.2. For the future, however, we have assumed a production of 35,000 tonnes on the pattern of that existing in 1970 for reasons explained in paragraph 6.3. According to International practice the price of dry Rubber S-1500 and S-1502 is the same irrespective of the process differences. For purposes of allocation of expenses to S-1712, (Oil Extended Rubber) this variety has been related in terms of dry Rubber production. Since S-1958 is a different variety of Rubber and involves extra usage of certain Chemicals, this factor has been given due weightage in allocating the different elements of cost to the Rubber section and to the various types of products.

17.4.8.2. The average consumption of cold and hot Latex separately for each of the different qualities of Rubber per tonne for the years 1968, 1969 and 1970 is given below :—

(Per Tonne of Rubber in Kgs.)

Description of Material	Dry Rubber				S-1958 Rubber			
	1968	1969	1970	For the future	1968	1969	1970	For the future
Cold Latex . .	1,049.78	1,053.71	1,041.46	1,041.46	533.78	526.19	555.51	550
Hot Latex . .	..	..	..	..	466.22	473.81	444.49	450

17.4.8.3. It has been explained in this connection that the proportion of cold to hot Latex depends upon the requirements of hardness in the Rubber. The Company had been intially having the ratio of cold to hot Latex as 50 : 50. Subsequently, this ratio has been undergoing changes, and of late due to the variations in the customer requirements, the Company has changed the proportion to 55 : 45. This position has been taken into account in determining the future estimated requirements of cold and hot Latex in the production of S-1958.

17.4.8.4. The consumption in respect of Chemicals for each variety has been determined as for the other processes, and the latest purchase price of Extender oil adopted for calculating the cost of Oil Extended Rubber.

17.4.8.5. *Packing.*—The cost of Polythene lined triple walled paper bags used for packing 30 kgs. each of S-1500/1502 and S-1712 SBR and 20 kgs. each of S-1958 grade Rubber, is Rs. 2.45 per bag delivered at the factory site. The Company has stated that it is going ahead with film wrapping as an additional precaution for Rubber packaging and has been given a foreign exchange loan for procuring the film wrapping machine. The additional cost of film wrapping is claimed to be Rs. 1.30 per bag. Since this packing is yet to be introduced, for our calculations, we have adopted the figure mentioned above *i.e.* Rs. 2.45 per bag. *If, however, this particular special packing is in fact resorted to, the packing element of the total cost would need some recalculation on the basis of actuals in arriving at the fair selling prices of the SBR products*

17.4.9. **Utilities :**

17.4.9.1. As mentioned earlier, the Company maintains a satisfactory system of cost accounting and separate cost sheets are prepared monthly for ascertaining the actual cost at each of the different major stages of production. The unit cost of production of the various utility departments namely brine water, steam, electricity, raw water, process water etc., is also worked out month by month. The costs

in respect of each of these utilities having thus been compiled separately are distributed over the production centres on the basis of actual consumption by those departments.

17.4.9.2. Steam is raised from purchased coal. The plant has two boilers each with 160,000 lbs. hour capacity designed to produce steam at 600 psi pressure. Power is also generated within the factory itself. There are two steam driven turbo generators each having 3000 k.w. capacity. In addition, there is also one diesel driven generator of 750 k.w. capacity to be used in emergencies. Water is obtained from tube wells situated within the factory premises.

17.4.9.3. The average cost per unit of some of these departments during 1968, 1969 and 1970 are given below:

Unit Cost

Departments	Unit	1968	1969	1970
		Rs.	Rs.	Rs.
1. Brine water .	1000 U.S.G.	162.01	186.36	187.91
2. Steam . .	Mill BTU	4.95	4.89	5.13
3. Electricity .	1000 KWH	25.03	33.96	31.35
4. Raw water .	1000 USG	0.13	0.13	0.13
5. Process water .	1000 USG	5.80	6.94	6.11
6. Cooling water .	1000 USG	2.22	2.68	2.98

17.4.9.4. The major elements making up the cost in respect of the various services can be broadly classified under coal, wages and salaries, chemicals, stores, fuel oil etc. The upward variations between 1968 and 1970 are to some extent due to marginal increases in the levels of consumption of some spares and stores but mainly on account of the rise in prices over this two year period. One of the main contributory factors we find has been the increase in the delivered

price of coal by Rs. 6.40 per tonne or approximately 9.6 per cent. In our estimates we have adopted the levels of consumption obtaining in 1970. As regards prices, taking the 1970 figures as the base, we have allowed an escalation by 5 per cent for the entire price period. No such addition is however, being provided in the case of coal as its price has been pegged by Government after a recent cost inquiry.

17.4.10. **Depreciation :**

17.4.10.1. The gross block value of the fixed assets at the end of 1970, as shown by the Company's Balance Sheet, amounted to Rs. 1709.90 lakhs and the depreciation written off to that date was Rs. 975.85 lakhs, thus showing a reduced balance of Rs. 734.05 lakhs. After adding Rs. 7.89 lakhs on account of work-in progress, the total value of net fixed assets would amount to Rs. 741.94 lakhs. The Company has been writing off depreciation in its books on the straight line method for plant and machinery, in accordance with the provisions of the Company's Act of 1956 (Section 205(2)(b)) and on the written down value basis at the Income Tax rates, for the other assets.

17.4.10.2. The Commission generally follows the Income Tax method of calculating depreciation on the written down value basis at the rates prescribed under the Income Tax Act in determining the costs and fair prices. The actual costs of production for the costed year 1968 and 1969 and for 1970 on the figures furnished by the Company, have been computed by us on this basis.

17.4.10.3. The Company has contended that for calculating the price of SBR, since its production commenced in 1963, Government had taken into account depreciation on the fixed assets on the straight line method adopted by it which, for the earlier years of operation worked out to considerably lesser amounts than under the written down value basis. .....
.....The Company has furnished figures to show that depreciation on the fixed assets from 1962 to 1970, on the reducing balance basis would have amounted to Rs. 13.43 crores as against Rs. 9.76 crores claimed by it in its accounts on the straight line method. Relying on these figures the Com-

pany has contended that in working out the production costs for purposes of price fixation, we should also adopt the straight line method as otherwise the arrears of depreciation of Rs. 3.67 crores would remain uncovered at the end of the life of the assets. If the facts are indeed as claimed by it, there is some force in this contention.

17.4.10.4. We have ascertained from Government that the selling prices fixed for this Industry prior to 1968, were on the basis of *ad hoc* discussions between the Company and the Ministries/Departments concerned. Therefore, there was presumably, no specific or deliberate decision on this question of the precise method to be adopted for calculating depreciation. Nor has the Company furnished to us any cost data for the earlier years to substantiate its contention that Government had actually adopted the straight line method of depreciation in the fixation of prices from 1963 to 1968 and that they had suffered thereby as the cost would have been higher if depreciation had been calculated on the written down value basis.

17.4.10.5. We have been informed by the Ministry concerned that the prices were fixed from 1-4-1968, on the basis of the detailed costing by the Cost Accounts Branch of the Ministry of Finance of the products manufactured by the Company and for this price fixation, depreciation had been reckoned on the written down value basis at the Income Tax rates for the first and second shift (whenever applicable). When a Statutory Price Control was first introduced from December 1969, the straight line method was however, adopted for working out the depreciation admissible in arriving at the fair prices.

17.4.10.6. However, we understand from the concerned Ministry that the difference between the admissible amount on the straight line method and the written down value basis was only marginal for the year 1968. As stated by the Company upto 1967 the annual provision of straight line depreciation was less than that on the written down value basis and from 1968 onwards it was more. Thus there seems to be no clear or firm evidence to support the claim that the Company had suffered in the earlier years by the method

adopted for allowing depreciation in the cost calculations for price fixation.

17.4.10.7. Without going into the merits and demerits of the written down value basis provided under Section 350 of the Company's Act and as prescribed under the Income Tax Act which allows higher depreciation to be written off in the earlier years of the plant life and the straight line method which evens out the writing off of depreciation in equal proportion over the life of the assets, till reduced by 95 per cent, in our cost calculations we have, as stated earlier adopted the written down value basis at the Income Tax rates as consistently done in all our Inquiries. *It may be noted that the depreciation admissible on our basis works out to Rs. 161 per tonne on the production estimated for the future price period as against Rs. 426 per tonne which would be admissible on the straight line method. If the latter method were to be adopted by Government, as was apparently done in the last price fixation, there would thus be an additional allowance of Rs. 265 per tonne, in terms of dry Rubber.*

17.4.10.8. The Company has also contended that the standard Income Tax rates for depreciation were not realistic for its Industry which was of a corrosive nature and had great fire hazards. No technical data or other evidence has been led to support the contention put forth. There are however many other Industries e.g. manufacturers of commercial Explosives, Acids and Alkalis and certain Plastics, which also employ highly corrosive and/or hazardous processes. There is thus no question of specially allowing a higher rate of depreciation for the fixed assets of this Industry than those provided under the Income Tax Act in respect of Chemical Industries.

17.4.10.9. The Company has also contended that in calculating depreciation it would be reasonable to take into consideration the replacement value of the fixed assets which according to it had risen to 200 per cent of the original cost. Although the demand for taking replacement cost into account in arriving at prospectively the figures of depreciation even on the WDV method, has been advanced by several

Industries, the issue is a highly complex one. Therefore, any departure on a selective basis, from a well-established practice would not in our view be justified. Moreover, in this particular case the Company itself maintains that its plant being Alcohol based, is an outmoded one. In that sense too, the question of its economic replacement is problematical and would not warrant any hypothetical assumptions.

17.4.11. **Allocation of Expenses:**

17.4.11.1. The expenses of service departments have been allocated in equal proportion as between the production departments, viz., Styrene, Butadiene, Latex and Rubber in the absence of any other dependable basis. Though this allocation may not be strictly correct from the cost accounting principles as the inputs, labour engaged and time involved in the different processes would vary, as the first three departments are for captive use and only Rubber is sold as the end product, it would not make any difference in the final cost of production of SBR. The Company has been charging depreciation, Head office expenses and technical know-how fees to Rubber directly as the ultimate product has to bear the incidence of these expenses in any case. However, we have allocated depreciation to the various processes in proportion to the Block value employed, and Head office expenses and technical know-how fees on the same basis as the one adopted by Government in the 1968 Inquiry by the Cost Accounts Branch of the Ministry of Finance taking all the relevant factors into account, in consultation with the Company.

17.4.12. **Bonus.**—The Company had not been paying bonus until 1968 for want of profits. In 1969 bonus was paid at the rate of 20 per cent to its employees. It is understood that a similar provision has been made for payment of bonus at the rate of 20 per cent for 1970 also. We have not come across any specific or formal agreement between the Management and Labour to the effect that it would be obligatory on the part of the Company to make payment of 20 per cent of wages by way of bonus irrespective of the profits earned. The absence of such an agreement presumably

also accounts for the fact that no bonus at all had been given for the first five years of its operation i.e. upto 1968, for want of profits. *We have therefore, restricted this item of bonus in our future cost structure to the statutory minimum, namely, 4 per cent of the wages.* The impact of bonus per tonne of dry Rubber thus works out to Rs. 9.62. *If however, the Company were to satisfy Government at a later date that there is a firm irrevocable additional commitment to Labour on this account the additional cost per tonne of dry Rubber for the remaining 16 per cent would amount to Rs. 38.48.*

17.4.13. **Special Repairs, Maintenance and Replacements, etc.:**

17.4.13.1. The Company has pointed out that in addition to the normal expenditure incurred under this head, it would have to spend about Rs. 60 lakhs for essential special repairs and maintenance during the coming two years. *Our Technical Experts, who studied these details, have accepted the justification for this item, especially as a higher volume of production was being assumed.* As to the quantum however, they were of the opinion that Rs. 39.25 lakhs would suffice for this purpose. They have arrived at this conclusion after a detailed intensive discussion with the Company's representatives. *We have therefore, admitted this reduced sum as revenue expenditure and an item of cost. The average amount charged per year would work out to Rs. 19.625 lakhs.* The impact on account of this item per tonne of dry Rubber is Rs. 64.40 or 6 paise per kg. at the estimated volume of production.

17.4.13.2. The Company has also stated that it would necessarily have to go in for extensive replacement of parts to keep the plant in a satisfactory working condition. The amount estimated on this account is of the order of Rs. 3.03 crores. We share the view that most of this is inescapable expenditure which is capital in nature, and which the Company would have to invest in its own interest to maintain production at an optimum level. We were further given to understand, in the course of our discussions, that even if orders for these essential additions and/or replacements were to be placed during the current year, it would take between

two to three years thereafter to receive and install them. Since the price period covered by us is only upto the end of 1973, and in any case firm commitment for these additions and replacements are yet to be made, it is not possible for us to make any anticipated provision on this account. As and when these renovations are completed, depreciation thereon at the appropriate rate would no doubt be taken into account in any future price fixation for the Company's products.

17.4.14. **Ex-factory cost of production :**

A summary of the total ex-factory cost of production of SBR of three varieties arrived at after inclusion of bonus at 4 per cent on wages (Rs. 9.62 per tonne and the additional provision Rs. 64.40 per tonne of dry Rubber) for special repairs and maintenance allowed for the future, as stated earlier, is given on next page. Credit has been taken in respect of scrap Rubber obtained in the process in arriving at this cost of production. The details of cost of the processes and of Rubber are contained in Annexures III to X.

Summary of the estimated cost of production of SBR for the future period ending December 1973

Rs./tonnes.

Particulars	S-1500/ 1502	S-1712	S-1958
1	2	3	4
Estimated Production (Tonnes)	13,380	16,830	4,790
1. *Direct-Materials* . . .	3,209.23	3,009.47	3,179.16
2. Conversion Charges . . .	230.93	169.01	230.92
3. Depreciation	32.41	23.72	32.41
4. Head Office Expenses . .	13.85	10.14	13.85
5. Total (1 to 4) . . .	3,486.42	3,212.34	3,456.34

1	2	3	4
6. Less credit for scrap Rubber .	14.29	15.74	16.94
7. Net Cost	3,472.13	3,196.60	3,439.40
8. Bonus at 4%	9.62	7.02	9.62
9. Provision for Special Repairs .	64.40	47.00	64.40
10. Basic Ex-factory Cost . .	3,546.15	3,250.62	3,513.42

17.4.15. **Gratuity :**

The Company desired that we should make a provision in our cost calculations for meeting the liability in respect of payment towards gratuity. The rules for the Company's gratuity scheme provide for payment on this account at the rate of one month's basic salary for every completed year of service, payable after 15 years continuous service. Thereafter the rate is reduced to ½ a month's basic salary for every further one year of service. *We find from the Profit and Loss Accounts and Balance Sheets of the Company that no provision has been made hitherto in its Annual Accounts,* to meet this liability. It has been stated in Schedule XVII of the Annual Report for 1970 that "no account has been taken of the present liability for future payment of gratuity to the employees—amount unascertained". *Hence the question of making any provision towards this item in our future cost structure does not yet arise.*

17.4.16. **Provision for price escalations :**

We have observed during the course of our investigation that the Company was likely to make purchases of Benzene from IOC the delivered price of which was higher than that from Hindustan Steel. Similarly, purchases of Butadiene from NOCIL is based on long term contracts. Extender oil is another item which is used in bulk in the Oil Extended Rubber. We have stated in paragraph 17.4.8.5 that for packing the increased cost when incurred may be allowed. In the following

Table we have shown the details of the impact on price per tonne of the various types of Rubber for every one rupee increase or decrease per kg. in their delivered prices during the price period over the figures adopted in our cost calculations. These figures are inclusive of the variation in interest charges due to consequential changes in the requirements of working capital. *Our calculations in the following Table are based on the increase and/or decrease in the average cost of the total quantities of Benzene, Butadiene, and/or Extender Oil purchased and used in any particular year.*

TABLE NO. 17.5

Effect of Variation in Rubber prices for every one rupee increase and/or decrease in the average Cost per kg. of the following Raw Materials over the figures mentioned in Col. (2)

Description of item	Price adopted in the estimates	Rubber		
		S-1500/ 1502	S-1712	S-1958
	Rs./Kg.	Rs./Tonne	Rs./Tonne	Rs./Tonne
1	2	3	4	5
1. Benzene* . . .	0.76,871	218.00	159.55	460.16
2. NOCIL Butadiene @	2.148	179.15	131.38	94.61
3. Extender oil . .	2.13	..	305.82	..

*At Rs. 768.71 per tonne as per agreement with HSL.

@Average of assumed consumption of 16035 tonnes of self generated Butadiene and 4932 tonnes purchased from NOCIL @ the current delivered price of Rs. 2148 per tonne.

17.5. Return (Gross Margin):

17.5.1. Having assessed the estimates of the cost of production of the various types of SBR for the future we have now to provide a reasonable gross margin to arrive at the

fair selling prices. This margin is intended to cover provision for dividends to the shareholders on their paid-up Capital, interest on the Reserves employed in business, both duly grossed up for Corporate Taxation, together with interest on Borrowings on the basis of actuals as well as on the estimated net requirements of Working Capital.

17.5.2. The Company has stated that the Return on Capital employed should be so calculated as to enable it to earn adequately to provide for (1) interest on working capital (2) reasonable dividend to share holders from the long term point of view, taking into consideration the need to compensate them also for the period of waiting from 1961 to 1968, when no dividends were paid, (3) reasonable margin for allocation of Researves for plough back and (4) adequate margin for payment of taxes on income. It has been also stated in this connection that this was a unique Industry, the plant was very capital intensive, the capital cost for unit of production having increased partly due to the need for self-sufficiency in the matter of provision of utilities, housing etc. and for intermediates like Styrene and Butadiene, and that too based on alcohol. They have therefore, urged that their case deserved special consideration. The Company has further averred that the capital employed should be taken to include Gross Block calculated on replacement cost basis and working capital equal to six months' cost of production. To enable the Company to earn enough to cover all the above items, it has been suggested that the Return on capital employed thus arrived at may be provided at a minimum of 20 per cent.

17.5.3. As stated earlier, the Company was not able to declare a dividend until 1968. For 1969 the Company distributed its maiden dividend of 6 per cent. Dividend at 12 per cent has been declared for 1970. We have taken note of this somewhat unusual position and have also kept this, among other things, in view in coming to a judgment as to the reasonable expectations of the shareholders by way of dividends for the years 1971-73. In addition, we have taken into account (a) the more optimistic demand estimates, the Company having by now overcome the initial consumer resistance to its product and the consequent higher level of

production, (b) the easier supply position of principal indigenous raw materials, (c) the progressive improvement in its debt-equity ratio as also debt servicing charges and, (d) the desirable price parities as between NR and SBR in making our recommendations as regards fair Return and prices payable to the Industry. *We are accordingly, providing for a dividend payment capacity at 9 per cent per annum on paid-up Capital. Following our normal practice, we have also provided for interest at the rate of 6 per cent on Reserves.*

17.5.4. **Working Capital:**

17.5.4.1. In computing the net capital employed, the requirements of working capital have to be estimated in addition to ascertaining the depreciated value of the fixed assets. So far as M/s. Synthetic & Chemicals are concerned, the average value of the raw materials, stores and finished goods in stock during 1968, 1969 and 1970 were of the order of Rs. 561 lakhs, Rs. 474 lakhs and Rs. 536 lakhs respectively. The year 1969 cannot be considered a normal one in view of the fact that the Company remained closed, for about two months during that time. During 1970, when production reached the peak so far attained, there was some abnormal accumulation of stocks, because of a fall in demand brought about through labour troubles and consequent stoppages in some of the major consuming units. Another factor to be reckoned with in determining the quantum of working capital so far as this factory is concerned, is that Extender Oil, all the Catalysts required and some Chemicals to be used in the process, in addition to some spare parts necessary for keeping the factory in running condition, are all imported items, the value of which may not remain static all through the price period. In addition to stocks of raw materials, stores and finished goods the Company would also be in need of some amount by way of liquid cash to meet the cost of goods in process and the day-to-day requirements of the business. Taking into account all these factors as well as the peculiar situation in which this factory is placed, we are of the opinion that a slightly higher figure than the amount normally allowed would be necessary in this case.

17.5.4.2. The Company has stated that six months' cost of production may be allowed to it for the purpose of working capital. We have, however, computed the working capital requirement on the basis of 90 per cent tank capacity for Alcohol and Benzene, 3 months' for the Extender Oil, 6 months' in respect of imported Chemicals and Catalysts, 3 months for indigenous Chemicals, and 4 months for stores and other miscellaneous spares and the finished stocks at 2 months' cost of production. These work out to a total of about Rs. 4 crores towards the working capital. In addition, we have provided Rs. one crore for the cost of goods in process and working funds necessary to meet the day-to-day requirements in carrying on the business. *Taking a realistic view we have thus arrived at an aggregate amount of Rs. 5 crores which roughly represents 5 to 5¼ month's cost of production, excludng depreciation.* Government, in an earlier Inquiry had allowed the working capital for the Company at 4 months' cost of production excluding depreciation. With the higher level of production estimated at 35,000 tonnes per annum for the future and rising Costs, we feel that the working capital estimated at Rs. 5 crores would be fair and reasonable.

17.5.5. So far as the question of calculation of Block value at replacement cost is concerned, it has been dealt with earlier in paragraph 17.4.10.9. relating to depreciation. In arriving at the future cost of production we have calculated depreciation at the written down value method as explained in paragraph 17.4.10.2. The average written down value of fixed assets based on this method of calculation, for the future price period, works out to Rs. 296.30 lakhs. This has been taken along with the working capital estimated at Rs. 5 crores in determining the total capital employed for the price period for a level of 35.000 tonnes of production of all Rubbers. We have also shown below, side by side, the capital employed if Government accept the Company's contention that straight line method of depreciation be adopted in determining the price for the future as done in the last Statutory price fixation. The difference so far as depreciation factor is concerned, as mentioned earlier in paragraph 17.4.10.7. amounts to Rs. 265 per tonne of dry rubber in the net fixed assets and consequently in the capital employed.

17.5.6. The following is the estimated Capital employed and the requirements of Return on both the above methods of depreciation calculation :—

TABLE NO. 17.6

Total Average Capital Employed for the future period ending December, 1973

	Method A Where Block and depreciation is calculated on Income tax Method of W.D.V.	*Method B* Where Block and depreciation is calculated on Straight line method
	Rs./lakhs	Rs./lakhs
1. Average Block value for he period ending per. December 1973	296.304	547.261
2. Working Capital	500.00	500.00
	796.304	1,047.261

TABLE NO. 17.7

Summary of Margin of Return for future price period ending December, 1973

(Rs./lakhs)

	Method A Where Block & Depreciation is calculated on Income tax method of W.D.V.	Method B Where Block & Depreciation is calculated on Straight line method
1	2	3
A. Capital Employed (Average)		
1. Papid up Capital	574.58	574.58
2. Reserves *less* investments, disclosure fees etc.	287.23	287.23
(a) 3. Loans	219.56	219.56

1	2	3
4. Capital employed	1,081.37	1,081.37
(b) 5. Reserve/Amount available for diversion/ expansion	285.07	34.11
6. Net	796.30	1,047.26
B. (i) Cost of production (inclusive of depreciation)	1,189.89	1,270.74
(ii) Depreciation	48.90	129.79
(iii) Net cost excluding depreciation	1,140.95	1,140.95
C. Requirements of Return:		
(i) 9% on paid up Capital at the end of 1970	51.71	51.71
(ii) 6% on Reserves	17.23	17.23
(iii) Total after taxation	68.94	68.94
(iv) Taxation at 55% Gross	84.26	84.26
(v) *Add* interest on long term loans (average of actuals)	(+)13.17	(+)13.17
(vi) *Less* estimated net income from investment of surplus funds @6%(—)	(—)21.91	(—)2.04
(vii) Total requirements/Gross	144.46	164.33
D. Profit margin inclusive of interests		
(i) Profit margin inclusive of interest per tonne of dry Rubber	473.83	539.00
(ii) Profit margin inclusive of interest per tonne of Oil Extended Rubber	345.90	393.47

1	2	3
E. Total requirements (D) as related to	%	%
(a) Capital employed (A 6) . . .	18.14	15.69
(b) Cost of production (B i) . . .	12.14	12.93
(c) Selling price proposed	10.69	11.32
F. Ratio of Capital employed to cost of seles i.e. cost of production (B i)	1:1.4942	1:1.2133
G. Return Net (C) (i+ii) on Net Worth (A) (1+2)	8.00	8.00

(a) Average of outstanding amount of long term loans, taking average repayment into account.

(b) Estimated amount of surplus out of Capital resources (A 1+2+3)

17.5.7. It would be seen from the above Table that the gross return allowed to the Company for the future price period for an estimated volume of production of 35,000 tonnes a year amounts to Rs. 144.46 lakhs under the written down value method of depreciating assets and Rs. 164.33 lakhs on the straight line method. As against this, the actual margin earned by it during 1970 was of the order of Rs. 241.70 lakhs, the production in that year being only 30,338 tonnes. Related to capital employed, the Return allowed works out to 18.14 per cent on the written down value basis and 15.69 per cent on the straight line method, as against 16.46 per cent earned by the Company in 1970.

17.5.8. The Ex-factory Cost of the three varieties of Rubber after inclusion of Return would be as under:

Estimated Basic ex-factory selling cost i. e. Cost of production including Return of SBR for the period ending December, 1973

(Rs./tonne)

	Method A			Method B		
	Where Block Value and Depreciation is calculated at written down value method			Whers Block Value and Depreciation is calculated on straight line method		
	S. B. R.			S. B. R.		
	S–1500/ 1502	S–1712	S–1958	S–1500/ 1502	S–1712	S–1958
1. Basic Ex-factory Cost of production	3546·15	3250·62	3513·42	3546·15	3250·62	3513·42
2. Difference in depreciation	..	..	..	265·00	193·00	265·00
3. Return	473·83	345·90	473·83	539.00	393·47	539·00
4. Total Basic Ex-factory selling cost i. e. Cost of production including Return	4019·98	3596·52	3987·25	4350·15	3837·09	4317·42

17.6. **Selling Expenses :**

17.6.1. The Company had since its inception an agreement with M/s. Kilachand & Devchand Company (P) Ltd., by which they were appointed as its Sole Selling Agents on a commission of 2 per cent on the net selling price of the products sold by or through these Agents. This selling agency agreement has been terminated with effect from 1-4-1970, although the Company continued to use the services of the Selling Agents on an actual cost basis until the end of August 1970. *Since* 1-9-1970, *however, the Company has set up its own selling organisation. The expenditure of this department based on the actuals for* 4 *months in* 1970 *and the benefits accruing from the latest agreement would amount to about Rs.* 17.48 *lakhs per annum.* This has been distributed over the estimated production and the unit impact so determined comes to Rs. 49.95 per Tonne. This has been added to the ex-factory cost of production to arrive at the ex-factory selling price of the three varieties of Rubber.

17.6.2. Sales are effected at the prices fixed by Government ex-Bareilly. The Company has four godowns one each at Bombay, Calcutta, Delhi and Madras and stocks are held therein for the convenience of the purchasers. When deliveries are to be made from these godowns an extra charge of 25 paise per kg. is made on the ex-Bareilly selling prices for deliveries from Bombay, Calcutta and Madras and 20 paise per kg. for deliveries from the Delhi godowns so far as S-1500/S-1502 and S-1712 varieties are concerned. In respect of S-1958 variety, the increase is 20 paise per kg. for deliveries from any of these four godowns. It was explained to us that this increase over the ex-Bareilly prices was intended to cover the transport charges from Bareilly to these godowns, and the up-keep thereof but lifting from these godowns was not compulsory. We were not able to determine the reasonableness or otherwise of these charges for want of full data which has not been furnished by the Company though called for. However, we feel that the actual transport cost from Bareilly to these godowns along with a reasonable Return thereon would have to be recovered from the purchasers in addition to the ex-factory selling charges

determined as above. In the absence of full data relating to additional expenditure in running these sales godowns, no provision has been made for these extra charges in our price fixation, which are for ex-factory deliveries.

17.7. **Central Excise Duty:**

There is at present a Central Excise duty of Rs. 300 per tonne of Rubber sold. This is not being included in the selling price recommended in the Report. Hence this amount as determined from time to time during the price period would be an addition to the selling price recommended by us.

17.8. **Fair Selling Prices:**

17.8.1. *Our recommendations regarding the fair selling prices after addition of the selling expenses to the ex-factory cost and exclusive of Excise duty and other charges as levied from time to time are summarised below:*

Recommended Selling Prices under both the Methods

	Method A Where Block Value and depreciation is calculated at W.D.V. method			Method B Where Block Value and depreciation is calculated on Straight line method		
	S B R Rs./tonne			S B R Rs./tonne		
	S—1500/ 1502	S—1712	S—1958	S—1500/ 1502	S—1722	S—1958
1. Basic Ex-factory selling Cost . .	4,019.98	3,596.52	3,987.25	4,350.15	3,837.09	4,317.42
2. Selling expenses	49.95	49.95	49.95	49.95	49.95	49.95
3. Total Selling price excluding excise duty & other taxes.	4,069.93	3,646.47	4,037.20	4,400.10	3,887.04	4,367.37
4. *Add* Excise duty and other Central and Local taxes levied from time to time.	..	..	..	..	..	..
5. Total Selling Price.	..	..	..	..	..	..
6. Selling Price per kg. of S.B. Rubber exclusive of excise duty at the present level and other taxes as levied	4.05	3.65	4.05	4.40	3.90	4.40

17.8.2. It would be seen that the above prices under Method A are considerably lower than the prevailing price particularly in respect of S-1958. S B R of this variety is used for sole making in shoe manufacture, and the others for tyre manufacture. Since the prices of tyres, shoes and other Rubber products are not under Statutory Control, it is not unlikely that the benefit of price reduction proposed by us may result in a transfer of profits from the manufacturer of SBR to the producers of the finished products. We therefore recommend that Government may devise and adopt suitable measures to ensure that the benefit envisaged by us actually accrues to the ultimate consumer. If the price computed on the basis of the written down value of assets is accepted, the price reduction would mean a saving to the ultimate consumer of the order of Rs. 221 lakhs per annum on the estimated volume of future production. If, on the other hand, the price is fixed on the basis of the straight line method for depreciation, the impact would be only on S-1958 variety of SBR and the saving to the consumer would be comparatively less by about Rs. 115 lakhs.

18. Conclusions, Suggestions and Recommendations

Our conclusions, suggestions and recommendations are summarised below :—

Main Recommendations :

(1) Our costing exercise was confined to the three main grades of SBR, namely, S-1500/S-1502, S-1712 and S-1958 and the fair ex-factory selling prices of these products recommended by us valid upto 31st December, 1973 are as under :—

Grades	Method A — Where Block Value and Depreciation are calculated on Written Down Value method		Method B — Where Block Value and Depreciation are calculated on Straight Line method	
	Rs. per Tonne	Rs. per Kg.	Rs. per Tonne	Rs. per Kg.
S—1500/1502 .	4,069.93	4.05	4,400.10	4.40
S—1712 . .	3,646.47	3.65	3,887.04	3.90
S—1958 . .	4,037.20	4.05	4,367.37	4.40

These prices, which are exclusive of the Excise duty and other Central and State levies, are subject to escalation/de-escalation for increase/decrease in the average cost adopted in the estimates in respect of (i) Benzene, (ii) Butadiene purchased from NOCIL, (iii) Extender Oil, (iv) Actual cost of special packaging, if and when introduced, and (v) Additional bonus upto 16 per cent over four per cent if so paid.

(Paragraphs 2.1., 17.4.8.5., 17.4.12., 17.8.1. and 17.4:16.)

(2) Depreciation admissible on the Written Down Value basis usually adopted by us works out to Rs. 161 per tonne of SBR as against Rs. 426 per tonne on the Straight Line method. If the latter method were to be adopted by Government, as was apparently done at the time of fixing the Statutory prices, there would be an additional allowance of Rs. 265 per tonne of dry Rubber.

(Paragraph 17.4.10.7.)

(3) For the purpose of fair price calculation, we have proceeded on the following main assumptions :—

(i) The average annual production during the price period would be 35,000 tonnes of SBR.

(Paragraph 17.3.3.)

(ii) The full requirements of Alcohol for the manufacture of SBR would be met from indigenous sources. The latest controlled price of Alcohol under the Ethyl Alcohol (Price Control) Order, has been adopted, except for transport charges on Molasses.

(Paragraphs 17.4.2.1. and 17.4.5.6.)

(iii) Benzene requirements would be fully met by supplies from Hindustan Steel.

(Paragraph 17.4.5.7.)

(iv) A part of the Butadiene requirements would be met by purchases from NOCIL.

(Paragraph 17.4.6.7.)

(4) The following provisions have been included in the fair price structure :—

(i) Wherever justified, increases have been allowed at appropriate levels, in respect of certain components of cost.

(Paragraph 17)

(ii) Bonus has been restricted to the Statutory minimum of four per cent of wages, as an item of cost.

(Paragraph 17.4.12.)

(iii) An additional sum of Rs. 19.63 lakhs per annum has been allowed towards special repairs and maintenance to enable the Company to optimise its plant utilisation.

(Paragraph 17.4.13.1.)

(iv) Return has been allowed at 9 per cent net on Equity Capital, 6 per cent net on Reserves employed in business and the actual interest payable on Loans.

(Paragraph 17.5.3.)

(v) The Working capital requirements have been computed at Rs. 5 crores per annum which roughly represents 5 to 5¼ months' cost of production, excluding depreciation.

(Paragraph 17.5.4.2.)

(vi) Since the Company itself has taken over the marketing of SBR from September 1970, a suitable amount has been allowed to cover the Selling expenses.

(Paragraph 17.6.1.)

(5) The question of making any provision towards Gratuity claimed by the Company does not arise, as no provision has hitherto been made under this head in the Company's Annual accounts.

(Paragraph 17.4.15.)

Ancillary Conclusions and Recommendations:

6.1. The rate of growth of consumption of all New Rubbers in India has been of the order of 8.1 per cent over the last ten years as compared to the world average of 6.5 per cent a year. In the matter of per capita annual consumption, however, India still stands among the lowest in the world at 0.21 kg. per head as against the world average of 6.04 kgs. Being a substantial producer of NR, the share of SR in the total consumption of New Rubbers in India is appreciably lower than in most other countries. Nevertheless, the Indian consumption of SRs has been rising at a faster rate and accounted for 13.3 per cent in 1960-61 and 27.5 per cent in 1970-71 of the total consumption of New Rubbers. This steady upward trend in the consumption of SRs is bound to continue as industrialisation progresses.

(Paragraphs 7.1, 7.1.1, 7.1.3.3 and 7.1.3.5.)

6.2. In the field of SRs, SBR has been so far playing the predominant role in India and this feature is likely to persist for sometime longer. According to Experts' estimates, even in the world SR economy, SBR is likely to continue to contribute well over 50 per cent of the total production of SRs for some more years.

(Paragraph 7.1.2.2.)

6.3. The use of SBR by the non-Tyre sector has nearly doubled itself at a compound rate of growth of 16.3 per cent per annum during the period 1966 to 1970 as against 6.8 per cent by the Tyre sector during the same period.

(Paragraph 13.2.1.2.)

6.4. The domestic demand for all types of Rubbers by 1973-74 is placed at 170,000 to 190,000 tonnes, made up of SBR—34,000 to 36,000 tonnes, Special purpose SRs—6.000 to 8,000 tonnes, NR—110,000 to 121,000 tonnes and Reclaimed Rubber—20,000 to 25,000 tonnes.

(Paragraphs 7.2.6 & 7 2.7.)

7. The production of all grades of SBR amounted to 15589, 21810, 25189, 24590 and 30338 tonnes in 1966, 1967, 1968, 1969 and 1970 respectively.

(Paragraph 6.3.1.)

8. The attainable production of all grades of SBRs of the Bareilly plant is placed at 34,000—36,000 tonnes per annum for the period ending December 1973. This should take care of the demand projection for SBR which is also 34,000—36,000 tonnes by 1973. In terms of dry Rubber, this would mean 30,000—31,000 tonnes against the guaranteed annual plant performance of at least 30,000 long (30,480 metric) tons.

(Paragraph 6.3.3.)

9. There does not seem to be any particular advantage in allowing an expansion of the present capacity at Bareilly even when the local availability of Alcohol might support a limited expansion. We feel sure that the question as to what should be done to replace and expand the existing capacity of SBRs by the end of 1980 or so would be receiving the attention of Government in the overall context of NR and SR requirements in our developing economy.

(Paragraphs 14.1.6 and 14.1.7.)

10. The desirability of setting up a High Powered Body consisting of representatives from Government, the Industry as well as the manufacturers of Rubber goods and raw materials, entrusted with the task of evaluating higher usage of SBR in different items of manufacture, more particularly in regard to its utilisation in the manufacture of passenger truck tyres, may be considered by Government.

(Paragraph 12.4.1.)

11. In the developed world markets, SBRs sell at a discount of approximately 16.5 to 22.4 per cent over NR. According to the Tyre manufacturers in India the use of SBR involves some extra processing cost of the order of five per cent or so, as compared to NR for the same type of applica-

tion. Other things being equal, they would expect SBR to sell at atleast about five per cent lower than the prevailing market price of NR.

(Paragraph 14.2.1.1.)

12. Government may devise and adopt suitable measure to ensure that the benefit of reduction in the prices of SBR envisaged by us actually accrues to the ultimate consumer.

(Paragraph 17.8.2.)

13. It is hoped that wherever necessary, effective and prompt steps would be taken by the suppliers of secondary raw materials to ensure that the products supplied fully conform to the I.S.I. or other well recognised Standard Specifications.

(Paragraph 8.4.2.1.)

19. Acknowledgements

19.1. We wish to express our thanks to the representatives of M/s. Synthetics and Chemicals, Bareilly, the sole producer of SBRs, the Association of Rubber Manufacturers in India, the Indian Rubber Industries Association, Tyre and Footwear manufacturers, suppliers of raw materials, particularly the All India Distillers Association and various other interests who furnished detailed information and whose representatives tendered oral evidence before us. We also thank the representatives of the Central and State Government Departments concerned and the Rubber Board, who assisted us during the course of the Inquiry. We are indebted to Dr. D. Banerjee, Director and Technical Adviser, National Rubber Manufacturers Ltd., and Inchek Tyres Ltd., Calcutta as well as to Shri J. J. Mehta, Chairman and Dr. R. A. Dhaul, Commercial Manager, Indian Petrochemical Corporation, Baroda who shared with us their expert knowledge of the Industry. Our thanks are also due to Shri D. S. Kulkarni, Editor, Rubber News, who called on us to exchange ideas on various issues connected with the Inquiry and provided us with useful technical journals concerning the Industry. We are also grateful to Shri G. S. Apte, Project Officer, Ministry of Petroleum & Chemicals, who

came down to Bombay periodically at our request and gave us the benefit of his experience and rendered valuable assistance at various stages of the Inquiry.

19.2. The Officers and staff of the Commission engaged on this Inquiry deserve a word of special praise and we record our warm appreciation of their unstinted co-operation and sustained hard work.

B. N. BANERJI,
Chairman.

F. H. VALLIBHOY,
Member.

PRAMOD SINGH,
Member.

P. V. GUNISHASTRI,
Secretary.

BOMBAY,
28*th August*, 1971.

APPENDIX I

(*Vide* Paragraph 1.1)

No. 20(2)-Tar/70

GOVERNMENT OF INDIA

MINISTRY OF FOREIGN TRADE

New Delhi, the 25th April, 1970.

To

The Secretary,
Tariff Commission,
C.G.O. Building,
101, Queen's Road,
BOMBAY-20.

SUBJECT : *Reference to the Tariff Commission for fixation of fair prices of Synthetic Rubber manufactured by M/s. Synthetics & Chemicals Ltd., Bareilly (U.P)*

Sir,

The S.B.R. type of Synthetic Rubber is presently manufactured in the country by M/s. Synthetics and Chemicals Ltd., Bareilly, Uttar Pradesh. Their licensed capacity is 30,000 tonnes per annum, but the actual production has been only around 25,000 tonnes per annum. This plant went into production six years ago and at that time the company had pointed out that their cost of production was much higher than what was estimated while planning the scheme so that the price of synthetic rubber they wished to establish militated against the use of synthetic rubber, *vis-a-vis,* domestic natural rubber and imported natural and synthetic rubber. They approached Government for special assistance in creating market for their production and after lengthy discussions, Government agreed to more or less direct major rubber consumers to lift the production of this plant by specifying percentages of synthetic rubber to be uplifted by each consumer and linking such uplifting with imports to be permitted. In return, M/s. Synthetics & Chemicals Ltd. came to an

understanding for fixation of prices of their products in agreement with Government of India. Ever since 1963 the Government has accordingly been fixing the prices at which M/s. Synthetics & Chemicals Ltd. may sell synthetic rubber. There has thus been an informal control on the price of synthetic rubber produced by this unit. The prices were adjusted from time to time to give relief to the company for increased costs of production on account of the imported alcohol content and to ensure a return on the capital that could enable them to stabilise financially. All through this period, the price of natural rubber was lower than the prices of synthetic rubber produced by M/s. Synthetics & Chemicals Ltd. The last of such price fixation was with effect from 4th April, 1968, after a detailed cost study by the Cost Accounts Branch of the Ministry of Finance, Government of India. Subsequently, due to a forecast of abundant availability of domestic alcohol and the increase in the prices of natural rubber, the selling prices of synthetic rubbers produced by M/s. Synthetics & Chemicals Ltd. were reviewed with a view to effect possible reductions and to provide a fair deal to the rubber consumers, who have more or less been forced in the earlier periods to consume fixed quantities of higher priced synthetic rubber from the Bareilly plant. The prices revised as a result of this review were discussed with the company and these were not acceptable to them. It was decided by Government that pending reference of fair price fixation of synthetic rubber manufactured by M/s. Synthetics & Chemicals Ltd. to the Tariff Commission, these prices should be enforced statutorily. A copy of the Control Order, bringing prices of synthetic rubber under statutory control along with the relevant notifications regarding prices and the appointment of a Controller, are enclosed.

2. In the circumstances explained, I am to request the Tariff Commission, under Section 12(d) of the Tariff Commission Act, 1951, to enquire into the fair selling prices of synthetic rubber manufactured by M/s. Synthetics & Chemicals Ltd., Bareilly and furnish its recommendations to the Government, as early as possible. The Commission will, no doubt, take into account all the facts bearing on the price of synthetic rubber.

Yours faithfully,

Sd./- (N. N. MALHAN)

Deputy Director.

Encls : *As above.*

PUBLISHED IN PART II—SECTIONS 3, SUB-SECTION (ii) OF THE GAZETTE OF INDIA EXTRAORDINARY DATED THE 16TH DECEMBER, 1969.

GOVERNMENT OF INDIA

MINISTRY OF PETROLEUM AND CHEMICALS AND MINES AND METALS

(Department of Petroleum & Chemicals)

New Delhi, the 16th December, 1969.

ORDER

S.O. 4922.—In exercise of the powers conferred by Section 3 of the Essential Commodities Act 1955 (10 of 1955), and with a view to regulate the sale of synthetic rubber produced indigenously at reasonable prices to the consumers of synthetic rubber, the Central Government hereby makes the following Order, namely :—

1. **Short title, extent and commencement.**—(1) This order may be called the Synthetic Rubber (Price Control) Order, 1969.

(2) It extends to the whole of India.

(3) It shall come into force with immediate effect.

2. **Definitions.**—In this order, unless the context otherwise requires,—

(a) "Controller" means a person appointed by the Central Government to be the Controller of Synthetic Rubber for the purpose of this Order;

(b) "dealer" means any person, who carries on the business of buying or selling synthetic rubber, whether or not in conjunction with other business and includes a manufacturer;

(c) "Manufacturer" means any person who manufactures synthetic rubber;

(d) "sale price" means net ex-works packed sale price including selling commission;

(e) Synthetic rubber means Styrene Butadiene Rubber of any of the types mentioned below and manufactured in India, namely :—

(i) Synthetic rubber Grades S-1500 and S-1502.

(ii) Oil extended synthetic rubber Grade S-1712.

(iii) Synthetic rubber Grade S-1958.

3. **Control of sale price.**—No manufacturer or dealer or other person shall sell or agree to sell or otherwise dispose of synthetic rubber at a sale price exceeding the sale price to be fixed in pursuance of clause 4.

4. **Fixation of sale price.**—The Central Government or the Controller may, having regard to the estimated cost of production of synthetic rubber manufactured in India, fix from time to time, by notification in the Official Gazette, the sale price of synthetic rubber so manufactured and different sale prices may be fixed in respect of different grades of synthetic rubber.

5. **Price list to be displayed at place of business.**—Every dealer shall display at a conspicuous part of the premises where he carries on his business in synthetic rubber a list of sale prices of the different grades of synthetic rubber kept for sale, in such a manner as to be easily accessible for consultation by any customer visiting the premises.

6. **Manufacturer and dealer not to withhold sale.**—No manufacturer or dealer shall withhold from sale any synthetic rubber ordinarily kept for sale.

7. **Powers to give directions, call for information, etc.**—The Controller, or such officer of the Central Government or the State Government as may be authorised by the Central Government in this behalf may, by order,

(a) direct any person who manufactures synthetic rubber in India or any dealer, to maintain such records relating to the manufacture or purchase or sale or other transaction, as the case may be, of synthetic rubber as the Controller or the officer authorised in this behalf may specify in the Order;

(b) specify the manner in which a manufacturer or a dealer shall keep accounts of any manufacture, purchase, sale of other transaction, as the case may be, in synthetic rubber;

(c) require any manufacturer or any dealer, to furnish within such period or at such intervals, such information, returns or reports relating to the manufacture or purchase or sale or other transaction, as the case may be, of synthetic rubber, in such forms as may be specified in the Order.

8. Powers of inspection, entry and search.—The Controller, or such officer of the Central Government or of the State Government as may be authorised by the Central Government in this behalf, may,—

(a) Inspect or authorise any person to inspect—

(i) any books, accounts or records relating to the manufacture of synthetic rubber and belonging to or under the control of a manufacturer of synthetic rubber in India;

(ii) any books, accounts or records to the purchase, sale or other transaction in synthetic rubber and belonging to or under the control of a dealer, or

(iii) any stocks of synthetic rubber belonging to or under the control of such manufacturer or dealer;

(b) Enter or search or authorise any person to enter or search any premises where synthetic rubber if manufactured or sold or where the Controller or the authorised officer has reason to believe that a contravention of this Order in respect of the synthetic rubber has been, is being or is about to be committed.

9. **Compilance of Orders.**—Every manufacturer or dealer or any other person to whom any order or direction is issued under any powers conferred by or under this Order, shall comply with such Order or direction.

10. **Appeal.**—Any person aggrieved by any order or direction of the Controller or the authorised officer issued under this Order, may, within thirty days from the date of receipt of a copy of such order or direction, file an appeal to the Central Government.

F. No. 5(7)/69-Ch.I.

To

The Manager,
Government of India Press,
New Delhi.

Sd/-
(M. RAMAKRISHNAYYA)
Joint Secretary to the Govt. of India.

PUBLISHED IN PART-II—SECTION 3, SUB-SECTION (II) OF THE GAZETTE OF INDIA EXTRAORDINARY, DATED THE 16TH DECEMBER, 1969.

GOVERNMENT OF INDIA

MINISTRY OF PETROLEUM AND CHEMICALS AND MINES AND METALS

(Department of Petroleum and Chemicals)

New Delhi, the 16th December, 1969

NOTIFICATION

S.O. 4923.—In pursuance of clause 4 of the Synthetic Rubber (Price Control) Order 1969, the Central Government, hereby, fix the

sale prices of synthetic rubber with immediate effect as follows :—

	Ex-Works Rs. per kg.
Synthetic Rubber Grades S-1500 and S-1502 . . .	4.40
Oil Extended Synthetic Rubber Grade S-1712 . . .	3.90
Synthetic Rubber Grade S-1958	6.80

(The above prices include selling commission)

Sd/-

(M. RAMAKRISHNAYYA)

Joint Secretary to the Govt. of India.

F. No. 5(7)/69-Ch.I.

The Manager,

Government of India, Press,

New Delhi.

PUBLISHED IN PART II—SECTION 3, SUB-SECTION (ii) OF THE GAZETTE OF INDIA EXTRAORDINARY, DATED THE 16TH DECEMBER, 1969.

GOVERNMENT OF INDIA

MINISTRY OF PETROLEUM AND CHEMICALS AND MINES AND METALS

(Department of Petroleum and Chemicals)

New Delhi, the 16th December, 1969.

NOTIFICATION

S.O. 4924.—In pursuance of clause 2(a) of the Synthetic Rubber (Price Control) Order 1969, dated the 16th December, 1969, the Central Government hereby appoints Shri A. Satyanarayana, Deputy Secretary to the Government of India in the Ministry of Petroleum and Chemicals and Mines and Metals, New Delhi, as the Controller of Synthetic Rubber with immediate effect.

Sd/-

(M. RAMAKRISHNAYYA)

Joint Secretary to the Government of India.

F. No. 5(7)/69-Ch.I.

The Manager,

Government of India Press,

NEW DELHI.

APPENDIX II

(*Vide* Paragraph 3.1)

List of firms, bodies and Government departments to whom Commission's questionnaires/letters were issued and those who replied or sent memoranda.

*Indicates who replied or sent memoranda.

A. Producer

* The Synthetics & Chemicals Ltd.,
7, Jamshedji Tata Road,
Bombay.

B. Prospective Producer

* Indian Petro Chemical Corpn. Ltd.,
P.O. Jawahar Nagar,
Baroda.

C. Consumers

(i) Manufacturers of Auto Tyres & Tubes

*1. The Firestone Tyre & Rubber Co. of India (Pvt.) Ltd.,
Hay Bunder Road,
Post Box No. 197,
Bombay-1.

*2. Ceat Tyres of India Ltd.,
Bhandup,
Bombay-78.

*3. The Dunlop Rubber Co. (India) Ltd.,
57-B, Free School Street,
Post Box No. 391,
Calcutta-16.

*4. Inchek Tyres Ltd.,
60B, Chowringhee Road,
Calcutta-20.

*5. Goodyear India Ltd.,
225C-Acharyya Jagdish Bose Road,
Calcutta-20.

*6. Madras Rubber Factory Ltd.,
P.B. No. 3760, Dhun Building,
1st Floor, 175/1, Mount Road,
Madras-2.

*7. Premier Tyres Ltd.,
Merchant Chambers,
41, New Marine Lines,
Bombay-20.

(ii) Manufacturers of cycle tyres & tubes

8. Associated Rubber & Plastic Works,
1, M.M. Ghose Road,
Dum Dum,
Calcutta-28.

*9. Central Rubber Works Pvt. Ltd.,
20/B, Tangra Road,
Calcutta-15.

10 National Rubber Mfgrs. Ltd.,
Leslie House,
19, Chowringhee,
Calcutta-13.

*11. Cosmos India Rubber Works Pvt. Ltd.,
7, Homji Street,
Bombay-1.

12. International Rubber & General Industries Ltd.,
G.P.O. Box No. 843,
89, Marine Drive,
Bombay-20.

13. Premier Rubber & Cable Industries,
Jamal Building,
211, Nagdevi Street,
Bombay-3.

*14. Bedrock Tyre & Rubber Co.,
Masjid Manor,
16, Bruce Street,
Bombay-1.

*15. Ruby Rubber Works Ltd.,
Rubynagar P.O.,
Changanacherry,
(Kerala State).

16. Trivandrum Rubber Works Ltd.,
Trivandrum-7.

17. New India Rubber Works (P) Ltd,
34-A, Debendra Chandra Dey Road,
Calcutta-15.

18. Shri Krishna Rubber Works Ltd.,
19, R.N. Mukherjee Road,
1st Floor,
Calcutta-1.

19. India Rubber Goods Mfg. Co.,
38-H-2, Canal East Road,
Calcutta-11.

(iii) Manufacturers of Footwear

*20. Carona Sahu Co. Ltd.,
Fort House, D.N. Road,
Bombay-1.

*21. Swastik Rubber Products Ltd.,
Swastik Building,
Behind Rly. Station,
Kirkee, Poona-3.

*22. Bata Shoe Co. (Pvt.) Ltd.,
Batanagar,
24-Parganas, West Bengal.

23. Anand Rubber & Cycle Industries,
Kapurthala.

24. Rubber House,
Naya Bazar,
Delhi.

*25. Trot Shoe Co. Pvt. Ltd.,
19/4A-Munshi Ganj Road,
Calcutta-23.

26. Ailga Rubber Works,
84/8, Faizal Ganj,
Kanpur.

*27. Friends Rubber Industries,
20, Basti Nau,
Jullundur.

*28. Goodday Rubber Industries,
87/6, Heera Ganj,
Kalpi Road,
Kanpur.

*29. Prince Rubber Industries,
8/158, Industrial Area,
Jullundur.

30. International Rubber Mfg. Co.,
51, Radha Nath Chaudhury Road,
Calcutta-15.

31. Paramount Rubber Works,
77/1, Christophar Road,
Calcutta-46.

(*iv*) *Manufacturers of Hoses & Belting*

32. Rubber Products Pvt. Ltd.,
Chincholi Naka,
Swami Vivekanand Road,
Malad, Bombay-64.

33 The General Rubber Co. Pvt. Ltd.,
P.B. No. 490,
New Delhi-1.

34. East India Rubber Works,
161, Chittaranjan Avenue,
Calcutta-15.

*35. Ind Co. Limited,
Rubber Division,
P-16, Kalakar Street,
Calcutta-7.

36. National Engg. Industries Ltd.,
(Rubber Division),
2, Beerpara Lane,
Dum Dum Road,
Calcutta-30.

*37. Kadar Rubber Manufacturing Co. Ltd.,
46-B, Shakespeare Sarani,
Calcutta-16.

38. Oriental Rubber Industries Pvt. Ltd.,
Agra Road, Bhandup,
Bombay.

(*v*) *Mfgrs. of Moulded & other Rubber Goods*

39. Hindustan Tyres Pvt. Ltd.,
Opp. Agripada Police Station,
Bombay-11.

*40. Hindustan Ferodo Ltd.,
Ghatkopar,
Bombay-77.

*41. Bramec Suri Pvt. Ltd.,
S.P. Mukherjee Marg,
Delhi-6.

*42. Associated Battery Makers Ltd.,
59, C, Chowringhee Road,
Calcutta-20.

*43. Bengal Waterproof Works (1940) Ltd.
41, Shakespeare Sarani,
Calcutta-16.

*44. Fort Gloster Industries Ltd.,
Cable Division,
14, Netaji Subhas Road,
Calcutta-1.

45. Amco Batteries Ltd.,
Badami House,
Narasimharaja Square,
Bangalore.

46. Mysore Electro Chemical Works Ltd.,
P.B. No. 1022, Malleswaram,
Bangalore-5.

*47. Standard Batteries Ltd.,
Vakola, Santacruz.
Bombay.

48. Oriental Rubber Works,
171A, Mahatma Gandhi Road,
Calcutta-7.

*49. Modak Rubber Products Pvt. Ltd.,
Kondivatta Road, Opp. Marol Bazar,
Andheri-Kurla Road,
Bombay-59.

50. Jastej Engg. & Metal Works,
P-36, India Exchange Place,
Calcutta-1.

51. Supper Rubbers,
Ettumanoor,
Kerala State.

52. Pharmaceutical & Allied Machinery Co.,
P. B. No. 7652, Kandivalee,
Bombay-67.

D. Consumers' Associations

1. Association of Rubber Manufacturers in India,
224, Lower Circular Road,
Calcutta-17.

*2. Indian Rubber Industries Association,
12, Rampart Row,
Bombay-1.

3. Consumer Guidance Society,
Maneckji Wadia Building,
127, Mahatma Gandhi Road,
Bombay-1.

4. Consumer Council of India,
175, North Avenue,
New Delhi.

E. List of Raw Material Suppliers

*1. M/s. Ajudhia Distillery,
Raja-Ka-Sahaspur (U.P.).

*2. M/s. Kesar Sugar Works Ltd.,
Baheri (U.P.).

*3. M/s. Oudh Sugar Mills Ltd.,
Hargaon (U.P.).

*4. M/s. Rampur Distillery & Chemicals Co. Ltd.,
Rampur (U.P.).

5. M/s. The Shamli Distillery & Chemical Works,
Shamli (U.P.).

*6. M/s. Saraya Distillery,
Sardarnagar (U.P.).

*7. M/s. Daurala Sugar Works,
Daurala (U.P.)

*8. M/s. Captainganj Distillery & Chemical Works,
Mansurpur (U.P.).

*9. M/s. Sir Shadilal Distillery & Chemical Works, Ltd.,
Meerut (U.P.).

*10. M/s. The Central Distillery & Chemical Works Ltd.,
Meerut (U.P.).

*11. M/s. Hindustan Sugar Mills Ltd.,
Golagokarannath (U.P.).

*12. M/s. Alco-Chem Ltd.,
Seohara (U.P.).

*13. M/s. Pilkani Distillery & Chemical Works,
Pilkhani (U.P.).

14. M/s. Simbhaoli Industries (P) Ltd..
Simbhaoli (U.P.).

15. M/s. Narang Industries Ltd.,
Nawabganj (U.P.).

*16. M/s. Modi Distillery,
Modinagar (U.P.).

*17. National Organic Chemical Industries Ltd.,
Sandoz House, Dr. Annie Besant Road,
Bombay-18.

*18. Hindustan Steel Ltd.,
Ranchi-2.

*19. All India Distillers' Association,
H-37, Connought Circus,
New Delhi.

F. Government Departments

*1. The Secretary to the Govt. of India
Ministry of Petroleum & Chemicals & Mines & Metals,
(Department of Chemicals),
New Delhi.

*2. The Director General,
Directorate General of Technical Development,
(Organic Chemicals & Petrochemicals Directorate),
Udyog Bhavan,
New Delhi.

*3. The Secretary,
Planning Commission,
(I & M Division),
New Delhi.

*4. The Collector,
Central Excise Collectorate,
Allahabad.

5. The Chief Secretary,
Government of U.P.,
Lucknow.

*6 The Secretary,
Rubber Board,
Kottayam-9.

7 The Commissioner of Civil Supplies,
Ministry of Industrial Development,
Internal Trade & Company Affairs,
Shastri Bhuvan,
New Delhi.

*8 The Director General,
Indian Standards Institute
Manek Bhuvan,
9, Bahadur Shah Zafar Marg,
New Delhi.

*9. The Collector of Customs,
Bombay.

*10. The Collector of Customs,
Calcutta.

11. The Collector of Customs,
Madras.

*12. The Collector of Customs,
Cochin.

*13. The Collector of Customs,
Vishakhapatnam.

*14. The Central Board of Excise & Customs,
New Delhi.

G. Indian Embassies/High Commissions Abroad

1. The Consul General,
Consulate General of India,
3, East, 64th Street,
New York. N.Y. 10021 (U.S.A.).

*2. The Counsellor,
Embassey of India,
15, Rue Alfred Dehodenca,
Paris-16C (France).

*3. The First Secretary,
Embassy of India,
Via-Francesco Denza,
Rome (Italy).

*4. The First Secretary,
C.D.A. High Commission of India,
200, Maclaren Street,
Ottawa-4 (Canada).

*5. The Deputy High Commissioner,
High Commission of India,
India House,
Aldwych,
London, W.C.2.

**6. The Counsellor, (Commercial),
Embassy of India,
262, Adenaturalle,
Bonn (Western Germany).

H. Others

1. Fair Trade Practices Association,
76, Veer Nariman Road,
Bombay-20.

*2. Polymer Publications,
Rubber News,
59, Alli Chambers,
Tamarind Lane,
Bombay-1.

APPENDIX III

(*Vide* Paragraph 3.2)

Names of the factories visited by the Commission and its Officers

Name of the place	Date of visit	By whom visited
1	2	3
	A. Commission	
1. Synthetics & Chemicals Ltd. Bareilly.	19-4-71 & 20-4-71	1. Shri B. N. Banerji, Chairman. 2. Shri Promod Singh, Member.
2. Technical Services Laboratory of Synthetics & Chemicals, Bombay.	27-4-71	1. Shri B. N. Banerji, Chairman. 2. Shri Promod Singh, Member.
	B. Officers	
3. Synthetics & Chemicals Ltd; Bareilly.	17-4-71 to 19-4-71	Shri K. P. Sarma, Cost Accounts Officer.
4. —do—	16-4-71 to 24-4-71	Shri M. S. Marballi, Technical Director (Chemicals).
5. Technical Services Laboratory of Synthetics & Chemicals, Bombay.	27-4-71	

APPENDIX IV

(*Vide Paragraph* 3.3)

List of persons who attended the Commission's Public Inquiry on 4th May, 1971

Name	Representing
Producers	
1. Shri Tulsidas Kilachand . .	Synthetics & Chemicals Ltd., 7, Jamshedji Tata Road, Bombay-20.
2. Shri Ramdas Kilachand . .	Do.
3. Shri D. M. Trivedi . . .	Do.
4. Shri K. B. Dabke . . .	Do.
5. Shri K. J. Paymaster . .	Do.
6. Shri S. A. Aiyar . . .	Do.
7. Shri P. C. Shankaran . .	Do.
8. Shri A. R. Kavarana . .	Do.
9. Shri G. S. Dugal . . .	Do.
10. Shri H. D. Patel . . .	Do.
11. Shri S. M. Khodker . . .	Do.
12. Shri M. M. Patel . . .	Do.
13. Shri G. N. Naik . . .	Do.
14. Shri K. Ramachandran . .	Do.
15. Shri N. M. Bhatt. . . .	Do.
16. Shri S. S. Nydoo . . .	Do.
17. Shri Suresh Kilachand . .	Do.
18. Shri A. N. Mazumdar . .	Do.
19. Shri V. S. Gorodia . . .	Do.
Prospective Produces	
Shri R. A. Dhaul . . .	Indian Petro-chemicals Corporation Ltd., P.O. Jawaharnagar, Distt. Baroda.

Name	Representing
Consumers	
1. Mr. G. T. Warner	Firestone Tyre and Rubber Co. of India Pvt. Ltd., Hay Bunder Road, Bombay-33.
2. Shri S. R. Srinivasan	Goodyear India Ltd., Mani Mahal, 11/21, Mathew Road, Bombay-4.
3. Shri R. F. Boga 4. Shri M. N. Mehta	Ceat Tyres of India Ltd., Bhandup, Bombay-78.
5. Shri P. K. Nair	Standard Batteries Ltd., Vakola, Santa Cruz, Bombay-55.
6. Shri C. S. Desai 7. Shri C. L. Pasricha	Premier Tyres Ltd., Merchant Chamber, 47, New Marine Lines, Bombay-20.
8. Shri L. M. Jamnadas	Cosmos India Rubber Works Pvt. Ltd., 7, Homji Street, Bombay-1.
9. Shri H. C. Dewan	Bata Shoe Co. Pvt. Ltd., 30, Shakespeare Sarni, Calcutta-17.
10. K. R. Sen Gupta	H. G. R. Industries, Calcutta.
11. Shri S. B. Nileshwar	Hindustan Ferodo Ltd., Ghatkopar, Bombay-77.
12. Shri Jose Joseph 13. Shri K. R. Naidu	Rubby Rubber Works Ltd., Rubynagar P. O., Changanacherry, (Kerala State).
14. Dr. B. Mookerjee	Inchek Tyres Ltd., AND Indian Rubber Industries Assn., 608, Chowringhee Road, Calcutta-20.
15. Shri N. M. Sabharwal	Dunlop India Ltd., AND Association of Rubber Manufacturers in India, 57-B, Free School Street, Calcutta-16.

Name	Representing
Consumers	
16. Shri K. M. Philip . .	Madras Rubber Factory Ltd., AND Indian Rubber Industries Assn., Dhun Building, 175/1, Mount Road, Madras-2.
Consumers' Associations	
1. Shri L. M. Jamnadas .	Indian Rubber Industries Assn., 12, Rampart Row, Fort, Bombay.
2. Shri B. B. Sangtani	Do.
3. Shri N. K. Patel .	Do.
4. Shri A. T. Mathyoo .	Association of Rubber Manufacturers in India, 224, Lower Circular Road, Calcutta-17.
Raw Material Suppliers	
1. Shri Ashis Chakravarti .	Hindustan Steel Ltd., P.O. Hinoo, Ranchi-2.
2. Shri B. T. Lavingia . .	Captainganj Distillery & Chemical Works, Mansurpur (U.P.).
3. Shri T. R. P. Raman .	National Organic Chemical Industries Ltd., Sandoz House, Dr. Annie Besant Rd., Worli, Bombay-18.
4. Shri Harish Madan .	Rampur Distillery & Chemical Co. Ltd., Rampur (U.P.).
5. Shri Jivanlal Chhotalal	Kesar Sugar Works Ltd., Bahari (U.P.).
Raw Material Suppliers' Associations	
1. Shri R. P. Nevatia . .	All India Distillers' Association, H-37, Connaught Circus, New Delhi.
2. Shri O. N. Chandoke .	

Name	Representing
Government Departments	
1. Shri G. S. Apte, Project Officer (Petrochemicals).	Ministry of Petroleum & Chemicals & Mines and Metals, Shastri Bhuvan, New Delhi.
2. Dr. N. V. C. Rao, Industrial Adviser (Chemicals).	Directorate General of Technical Development, (Coordination III Section), Udyog Bhavan, Maulana Azad Road, New Delhi.
3. Dr. R. K. Banerji, Joint Director (Chem.).	Planning Commission, Yojana Bhuvan, New Delhi.
4. Shri T.N. Bhatia, Deputy Director.	Director of Industries, Government of U.P., Kanpur.
5. Shri S. D. Verma, Asstt. Collector.	Central Excise Collectorate, Allahabad.
6. Shri G. S. Abhyankar .	Indian Standards Institution, Novelty Chambers, Grant Road, Bombay-7.
7. Shri R. G. Unny .	Rubber Board, Kottayam.
8. Shri N. R. Benjamin, Asstt. Collector.	Collector of Central Excise, P.B.No. 11078, Bombay-20.
9. Shri H. R. Gulrajani, Appraiser.	Collector of Customs, Bombay.
10. Shri R. Ramanujam, Officer on Special Duty.	Ministry of Industrial Development, New Delhi.
11. Shri R. K. Talwar, Joint Secretary.	Civil Supplies Commissioner, Ministry of Industrial Development, New Delhi.
Others	
1. Shri K. Ramchandran, Market Research Officer.	Industrial Credit and Investment, Corporation of India Ltd., 163, Backbay Reclamation, Bombay-20.
2. Shri D. S. Kulkarni, Editor .	Rubber News, 59, Alli Chambers, Tamarind Lane, Bombay-1.

APPENDIX V

(*Vide* Paragraph 4.1)

World production and Consumption of NR, SR & SBR and Percentage Consumption of SR to New Rubber and SBR to SR, 1965—1970 (Excluding East Bloc)

(Unit : Tons)

Year	Natural Rubber		Synthetic Rubber		S B R		Total New Rubber Consumption	Percentage Consumption of	
	Production	Consumption	Production	Consumption	Production	Consumption		SR to New Rubber	SBR to SR
WORLD (Excluding East Bloc)									
1965 . .	23,80,000	18,71,650	30,28,280	29,52,000	N.A.	N.A.	48,23,650	61.2	N.A.
1966 . .	24,37,500	19,55,600	33,62,525	32,52,500	N.A.	N.A.	52,08,100	62.5	N.A.
1967 . .	24,87,500	19,18,650	34,41,950	33,22,750	N.A.	N.A.	52,41,400	63.4	N.A.
1968 . .	26,32,500	21,33,150	39,76,700	38,50,750	N.A.	31,76,900	59,83,900	64.4	82.5
1969 . .	28,85,000	22,30,500	44,86,850	43,18,750	N.A.	N.A.	65,49,250	65.9	N.A.
1970 . .	29,12,500	22,62,750	47,48,400	44,25,250	N.A.	29,49,000	66,88,000	66.2	66.6

Sources : (1) 'Rubber Statistical Bulletin', published by the Secretarial of International Rubber Study Group, London.

(2) 'SEARCH' published by Compendium Publishers International Corpn., U.S.A.

(3) Gummi Asbest Kunstatoffe.

N.A. : Not available.

APPENDIX VI

(*Vide* paragraph 4.1.3. and 6.3.7.)

*Total World ** Synthetic Rubber Production*

('000's M T)

	1965	1966	1967	1968	1969 Estimated	1970 forecast	1971
	1	2	3	4	5	6	7
1. U.S.A.	1,842	2,002	1,943	2,165	2,286	2,220	2,425
2. Canada	206	203	200	197	199	205	215
3. *Western Europe*							
W. Germany	164	196	190	238	292	300	315
France	148	164	189	223	275	310	315
Netherlands	100	110	125	163	214	205	210
Italy	120	122	118	125	135	160	165
Belgium	20	20	20	25	35	40	45
Spain	..	1	12	27	35	40	45
	552	613	654	801	986	1,055	1,095

	1	2	3	4	5	6	7
4. India	16	16	22	25	25	32	36
5. *Others*							
Japan	161	233	281	381	527	690	775
U.K.	175	194	204	237	273	320	330
Brazil	36	54	52	59	62	72	75
Mexico	. .	1	20	34	36	40	44
Argentina . . .	3	10	17	23	37	38	38
Australia . . .	21	20	26	31	33	35	37
Rep. of S. Africa . .	16	19	24	25	24	29	34
	412	531	624	790	992	1,224	1,333
World Total	3,028	3,365	3,443	3,978	4,488	4,736	5,104

NOTE : (i) The total tonnage for Total World** Synthetic Rubber Production although growing each year is falling off in its rate of increase as shown by the following Table :

			Total World** %	Total World** minus U.S.A. %
1968	over	1967	15.5	20.9
1969	over	1968	12.8	32.5
1970	over	1969	5.5*	14.3
1971	over	1970	7.7	5.7

* This figure is low due to rubber and automotive strikes in U.S.A. which actually resulted in a negative growth for U.S.A.'s production in 1970 over 1969.

** Excludes Eastern Bloc and Mainland China statistics.

APPENDIX VII

(*Vide* paragraph 14.1.6.)

The Apparent Savings in Foreign Exchange as furnished by M/s Synthetics & Chemicals Ltd.

Total Sales upto June 1970 : 133000 tons valued @ Rs. 63 crores

Landed cost of Imported SBR : on an average 21 cents per lb. (Excluding customs duty)

Foreign Exchange saved :

Sales prior to devaluation	36,000	tons valued @	Rs. 8 crores.	
Sales post devaluation .	97,000	tons valued @	Rs. 34 crores.	
	133,000		Rs. 42 crores.	

LESS	*Rs. in crores*:	
Reimbursement of expenses to Firestone . .	0.39	
Payment of disclosure fees to Firestone . .	0.14	
Payment to Firestone for interest . . .	1.34	
Payment to Firestone for dividend (less tax) .	0.06	
Payment to Firestone for Tech. know-how fees (less tax)	1.08	
Value of licences received for Raw Materials & Spares	9.00	12.01
		29.99
		Say
Net Savings of Foreign Exchange	Rs. 30 crores	

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