CONSUMERS' PREFERENCE OF NATURAL RUBBER

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In order to find out the difficulties experienced by the rubber goods manufacturers in the present grading and packing of natural rubber, to ascertain the acceptability of the proposed I.S.I. grading and to study the marketing pattern, a survey was initiated. This article comprises the findings of the survey, which includes aspects such as: historical background, basis of survey, source of supply, mode of transport, shortage, packing, bale size, technical specification and other details.

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Introduction

NATURAL rubber is produced mainly by the Southern States of India and Kerala has a virtual monopoly in production. Kerala accounts for a little over 90 per cent of the total production of rubber. At the end of 1968-'69, the area under rubber in India was 1,88,000 hectares. India was able to produce 71,054 tonnes of natural rubber in 1968-'69, of which, about 66,000 tonnes were sheet and crepe rubber and the remaining latex concentrates. Natural Rubber producers are grouped statutorily into large growers having above 50 acres (20.23 hec.) and the remaining as small growers.

Though over 90 per cent of natural rubber is produced from the State of Kerala, the state accounts for only about 7 per cent of consumption of rubber. The consumption of natural rubber in India was 86,600 tonnes in 1968-69. The main states of rubber consumption are according to importance — West Bengal, Maharashtra, Tamil Nadu, Hariyana, Kerala and the centrally administered area of Delhi. Out of 1,164 manufacturers in India in 1968-69, 7 manufacturers produced mainly automobile tyres and tubes in 8 factories. Others produced various types of rubber goods. cycle tyres and tubes, footwear, hoses, belts, ebonites, dipped goods. Dipped goods are produced mainly by the small units.

An examination of consumption of rubber in India will show that about 60 per cent is consumed by 8 units producing tyres and tubes. About 13 per cent of rubber is consumed by units manufacturing footwear. The remaining 27% of consumption is shared by manufacturers of other products.

The manufacturers use 3 types of rubber among which natural rubber is the most important. At present about 66 per cent of the total consumption of all variaties of

rubber is natural rubber. Synthetic rubber accounts for about 23 per cent and the rest is reclaimed rubber.

Evolution of Market Grades

As early as 1890 Mr. J. N. Ridley observed that rubber would dry better and quicker, if made in thin sheets. Around the close of the last century, Mr. John Parkin in Ceylon developed the method of coagulating latex with acetic acid. The early planters were aware that smoke was employed in the preparation of Brazilian rubber. Hence the practice followed and fortunately smoking prevented mould growth. Rapidly there developed the habit of grading smoked sheet by colour. The Rubber Association of America which became the Rubber Manufacturers' Association in 1929, issued its list of types and grades which was the direct precursor of the present day international grading system. It was a major step in the sense that the world's largest rubber consumer the USA was laying down firm rules as to type and quality. The original list of official types was brief, recognising only eight grades, four of ribbed smoked sheets and four of pale crepe. In 1929, further revisions were made leading to a system which apart from minor alterations in 1938 remained unchanged until after world war II.

The RMA system of 1928-38 was revised and renewed in a series of Green Books (1952, 1954, 1957, 1962 and 1968). These changes were the result of a series of International Quality and Packing Conferences.

Grading in India

The grading of natural rubber in India follows closely the international pattern. We have 22 grades under seven groups. In addition, there are 3 groups for latex of different. concentrations. The top grade of sheet rubber is called RMA IX. The abbreviation "RMA" stands for Rubber Manufacturers' Association of New York who had formulated the international standard for natural rubber.

The natural rubber grading is based on visual inspection. The quality of rubber decreasing with the increase in the percentage of mould, sand, bark, blemishes etc. and also according to the changes in colour found in rubber. Among the seven, Pale Latex Crepe rubbers are priced higher than any other type followed by the RMA Grades. The Estate Brown Crepes which are made out of scrap rubber, are of inferior quality, and are priced lower. The grade-wise consumption of natural rubber is given in the Table 1 below :

Since grading of rubber is visual, it throws a lot of difficulties to the producer and consumer. It has been observed that some of the processes involved at the estate level are redundant for the manufacturers. As a result, there has been developments in important rubber growing countries towards new methods of rubber grading. The technical specification which was introduced by I.S.O. and developed in Malaysia based on dirt content, manganese, copper etc. is intended to displace visual grading and to place the grading of natural rubber on a more scientific basis. This system of grading is known as SMR. The Indian Standards Institution has drawn up a standard for the grading of rubber in India based on SMR specification.

Purpose of The Survey

A survey was initiated for the purpose of finding the difficulties, if any, experienced by rubber manufacturers, in the present grading and packing of rubber and also to ascertain the acceptability of the ISI grading proposed recently. It was also the intention of the survey to ascertain the specifications desired by manufacturers in the presentation of natural rubber. The data

TABLE 1

Gradewise Consumption of Natural Rubber During 1968-1969

Grade	*Tonnes*	*Percentage to Total*
RMA IX & 1	29,721	36.7
RMA 2, 3 & Cuttings No. 1	22,941	28.3
RMA 4, 5 & Cutting No. 2	9,965	12.3
Precoagulated Crepe PLC IX 1, 2 and 3 FAQ.	2,090	2.6
Estate Brown Crepe Super IX EBC IX, Smoked Blanket, Remilled Crepe 2	9,392	11.6
Estate Brown Crepe 3X, Remilled Crepe 3 & 4	6,334	7.8
Flat Bark	573	0.7
Total :	81,016	100.0

collected in the survey related to the period 1968-'69.

Coverage

The number of licensed rubber goods manufacturers at the end of March 1969 was 1164. Only manufacturers consuming more than 150 tonnes per annum were taken for the survey. Such manufacturers numbered 140 at the end of the period. They were selected because generally such manufacturers had the facilities for testing rubber as required for the study. Indigenous rubber alone was considered for the study. In the survey, questions relating to latex were left out since the specifications and properties of latex are considerably different from that of sheet rubber. A detailed questionnaire was prepared on the subject and was sent to 140 manufacturers for their replies. Out of the 140 manufacturers, 72 manufacturers have given replies. This includes 6 automobile tyre and tube manufacturers out of 7; 12 shoe manufacturers and 54 other manufacturers. The 72 manufacturers accounted for 72% of the total consumption of rubber during 1968-69. The details are given in Table II.

FINDINGS OF SURVEY

Source of Supply

As one of the objects of the survey was to study the marketing pattern, a question was included as to the source of supply of rubber. It was observed that out of 72 manufacturers, 47 were obtaining rubber exclusively from Kerala and the remaining 15 from Kerala as well as their place of manufacturing. In the remaining 10 cases, the source of supply was located near the place of manufacturing.

Mode of Transporting

Rubber is transported by ship, rail and road. Out of the 72 manufacturers, 22 were receiving rubber by ship, 15 by road and 7 by rail, exclusively. Of the remaining; 10 manufacturers received rubber by ship and road; 3 manufacturers by ship, rail and road; and another 3 manufacturers by rail and road. The remaining manufacturers have not replied to the question.

In order to get a good picture of the volume of rubber despatched from Kerala and Tamil Nadu, by various modes of transportation, we have analysed the data available in the declaration in Form 'N' received in the office. The results are summarised in table 3.

Shortage

The shortage in weight experienced by the manufacturers during the year under study was also assessed separately when the source of supply was from dealers and estates. Of the 72 manufacturers, 41 manufacturers had occasional shortages when the rubber was received from dealers, whereas 26 manufacturers reported that they had no shortage, while one manufacturer had shortages in all the bales purchased and 4 manufacturers had not replied to the question.

Out of 50 manufacturers who were also purchasing rubber from estates, 13 had reported occasional shortages; whereas 36 manufacturers had no shortage, while one manufacturer had shortage in all the bales.

The loss in transit has also been studied. The manufacturers were asked to pinpoint the loss at the wharf, during transport and storing. Only 13 manufacturers have re-

TABLE 2

No. of manufacturers replied to the questionnaire		*Total consumption in tonnes during 1968-69. (Tonnes)*
Tyres manufacturers	6	46,444
Footwear	12	9,220
Others	54	6,567
Total :	72	62,231

TABLE 3

Mode of Transport of Natural Rubber from Kerala State and Tamil Nadu to other places in 1967.

(Tonnes)

Places	*By Ship*	*By Rail*	*By Road*	*Total*
West Bengal	22,533	238	132	22,903
Maharashtra	11,635	76	298	12,009
Delhi	—	2,301	1,157	3,458
Other places	281	4,474	16,001	20,756
Total :	34,449	7,089	17,588	59,126
Percentage to total :	58.3	12.0	29.7	100.0

ported any loss either in wharf or in transit or in storage. The total percentage loss varies from 0.2 to 2.1.

Packing

The packing of rubber is an important item and hence the type of packing was also elicited from manufacturers. Of the 72 manufacturers, 38 manufacturers had reported that the rubber they received was packed in hessian. 16 manufacturers received rubber packed in bare back in chalk, 13 manufacturers in hessian packing as well as in bare back in chalk; one in gunny bag, another one in paper and plywood; and two others in loose packing. One manufacturer has not replied to this question. No manufacturer has reported that he received rubber in polythene.

The present trend in other countries is to pack rubber in compatible polythene. Polythene will help to avoid contamination at the transit level and reduce the cost of processing, since the rubber goes straight into the mixer with the packing material. However, polythene as a packing material may be costlier than the conventional packing. The possibility of introducing polythene packing for rubber bales was also ascertained through the questionnaire. Accordingly, 66 manufacturers have stated that they would prefer packing in Polythene sheet and four manufacturers have replied in the negative. Two manufacturers have not replied to the question. Packing in polythene will improve the presentation of natural rubber.

It may be noted that the ISI has specified in the standard that rubber should be wrapped in polythene sheets and should be further wrapped outside with jute, hessian or paper.

Bale Size

To ascertain the desirable size of bale, the manufacturers were asked to state the size of the bale they are receiving and the size they would prefer. From the replies received, it has been observed that 46 manufacturers are receiving bales of 100 kgs. (Vide Table 4). To a question whether reduction of bale size would solve some of their problems, 38 manufacturers replied positively. Only 55 manufacturers responded to this question. The manufacturers were also asked to state the bale size they would prefer. The replies are summarised in Table 5.

TABLE 4

Distribution of Manufacturers According to the weight of the bale they are getting

Weight of the bale	*No. of Manufacturers*
100 kgs.	46
50 „	3
25 „	1
100 & 50 kgs.	10
25, 50 & 100 kgs.	8
Answer not given	4
Total :	72

TABLE 5

Bale Weight kgs	*No. of Manufacturers who prefer bale weight as reported in column (1)*
20	4
25	11
30	1
50	11
100	7
25 to 50	3
25 to 30	1
Other sizes	2
Total :	40

The number of manufacturers replied to this question includes 6 tyres manufacturers and 5 footwear manufacturers. They account for 62% of total consumption of natural rubber in India. Out of the six tyre companies, one leading tyre company would prefer 33.3 +- 0.5 kgs. as the bale weight. If this is not available, they would prefer 25 kgs. as bale weight. Two other tyre companies would prefer 25 kgs, as bale weight. Of the remaining 3, one would prefer the bale weight between 25 to 35 kgs., and the other 20 to 25 kgs. The remaining one has not stated any preference. Of the 5 footwear manufacturers, one leading firm has stated that they would prefer 20 kgs. as bale weight. From the replies it can be safely concluded that the manufacturers consuming about 60% would like to have the bale weight around 25 kgs. It may also be noted in this connection, that the ISI has prescribed in the standard that the raw rubber should be packed in 25 or 50 kgs bales.

By custom the grade of natural rubber is written on the bale. Therefore, the manufacturers were asked to state whether they received the rubber clearly marked with its grade on the bale. Of the 72 manufacturers, 47 have stated that they received the bale clearly marked and 15 manufacturers have replied in the negative. 8 manufacturers received rubber occasionally marked; while 2 manufacturers have not replied to the question. The ISI has recommended that each bale of raw natural rubber should be marked indelibly with grade of rubber, name of the producer/estate or trade mark, if any, and year of production.

Technical Specification

The grading and specifications of natural rubber is rapidly changing to meet the challenges from the synthetic rubber. In international level the

visual grading system as laid down in the Green Book has already given way to the technical classification system, and technical specification system. With the introduction of new forms of rubber such as pellatised rubber and constant viscocity rubber and peptorub, the visual specification is becoming obsolete.

The technical specification scheme ensures uniformity and quality of natural rubber.

Dirt

The dirt contents for the three grades of rubber as per Indian Standard Specification, are given in Table 6.

From the survey, it is seen that 3 firms wanted rubber as per Indian Standard Specification. But the tolerant limits of the other 15 firms accounting 54% of the total consumption of natural rubber are widely different. Though every manufacturer would like to have as less a dirt content as possible, the survey reveals that actually a dirt content of as high as 1.75% can be tolerated in the E.B.C. Grades. For P.L.C. grades, the tolerance limit is as high as 1.5%. All the firms excepting 3 can tolerate dirt only less than 0.25 per cent which is well within the specifications detailed in Table 6. In the case of RMA grades, the situation is similar.

To achieve such cleanliness, the planters should make an effort. Most of the large estates may not find it difficult to produce rubber to the specifications, but the small holders will have to take additional precautions to keep the level of the dirt as low as possible. The latex should be sieved through a 40 mesh and 60 mesh sieve to remove dirt, whenever possible the use of bulking tanks will help to reduce the dirt content in rubber.

Copper

Copper catalyses the Oxidative degradation of natural rubber, resulting in loss of desirable properties of rubber. The specification allowed only a maximum of 8 ppm. in all grades of rubber. The tolerant limit of the manufacturer is upto 25 ppm. with an emphasis on as low a copper as possible. The majority of the manufacturers require less than 8 ppm. of copper.

With minimum care this can easily be achieved. Copper occurs in latex as part of an enzyme and in normal latex, it is well below 5 ppm. However, copper contamination of latex can occur, especially due to spraying of copper based fungicides and careless handling of the latex and rubber. It is advisable not to tap the trees on spraying days and avoid all copper vessels and utensils to come into contact with rubber. The sieves should be made of monal metal; now plastic sieves are also available.

Manganese

High manganese is not a problem at all in latex products. But lace scrap is high in manganese. Maximum allowable manganese content is 10, 15, 25 ppm. for Grade A, B and C. The survey clearly indicates that this is a very strict specification and that a few manufacturers can tolerate manganese upto a level of 75 ppm. The majority of the manufacturers specify the manganese content below 20 ppm.

Avoiding the lace scrap or by judicial admixture of lace scrap with other scraps the specification can easily be met.

Nitrogen

Nitrogen is specified as maximum 0.7% in the technical specification. It is to give an assurance for the manufacturers that the rubber is not adulterated with skim rubber. If rubber is adulterated, the Nitrogen content will be above 0.7%. Though the requirements of the manufacturers in this regard are as low as 0.25% and as high as 3.75%, the 0.7% limit is reasonable enough and most of the plantation rubber, if unadulterated will have a nitrogen content well below 0.7%. But a demand for 0.25% is unrealistic

TABLE 6

Chemical Requirements for Natural Rubber (ISI Specification)

Characteristic	*Requirement for Grade A*	*Grade B*	*Grade C*
1. Dirt content (% by weight, maximum)	0.05	0.20	0.50
2. Volatile matter (% by weight, maximum)	1.00	1.00	1.00
3. Ash (% by weight, maximum)	0.60	1.00	1.50
4. Copper (as Cu) (parts per million, incorparate maximum)	8.00	8.00	8.00
5. Manganese (as Mn), (parts per million, maximum)	10.00	15.00	25.00
6. Nitrogen (% by weight, maximum)	0.70	0.70	0.70

Note:- The ISI has recommended the following limits for Plasticity Retention Index:-

		PRI Min
Grade A	—	80
„ B	—	60
„ C	—	40

from the practical point of view except in the case of highly purified rubber like P.L.C.

Volatile Matter

The 1% maximum limit of volatile matter in the specifications ensures adequate drying of rubber. The survey indicates that manufacturers requirement is between 1.5% to 2%. Though 2% can be achieved from a practical point of view, 1% is a realistic maximum limit for the specification. This can be easily achieved by adequate drying of rubber.

Mooney Viscosity

Most of the synthetic rubber is sold to specification regarding the mooney viscosity. This ensures uniformity of the product and is an indication of processability of rubber. From the survey, it is evident that most of the manufacturers require a mooney viscosity of 70—85. It will place the natural rubber in a better position than the synthetics if a constant mooney rubber can be put into market. For large producers this is possible, though for small holders the task is not formidable. Already Malaysia has advanced in this line and constant viscosity and peptorub rubber are now marketed.

In India also, it is high time we think in terms of constant viscosity rubber to place natural rubber on a better footing than the synthetics.

Other Details

Other details elicited through the questionnaire included whether rubber was received by the manufacturers fully insured and whether the dealer or estate supplied the grade ordered for. 46 manufacturers have replied that they received rubber insured and 16 manufacturers replied negatively. In the case of two manufacturers occasionally, they received rubber insured.

To the other question, 43 manufacturers have replied that they generally received the grade of rubber ordered for; whereas 9 manufacturers have stated that they did not receive rubber ordered for; while 8 manufacturers stated that they occasionally received rubber and the remaining 12 manufacturers have not replied to the question.

Main Summary of Conclusions

The following main conclusions are derived from study :-

1. Shortage in weight was more when rubber was received from dealers, compared to estates.

2. A large majority of manufacturers would like to have rubber packed in polythene.

3. Majority of manufacturers would like to have the bale weight around 25 kgs.

4. On the whole it is found that the manufacturers have not much difficulty in following the standard prescribed by I.S.I.

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NRPRA ENGINEERING CONFERENCE

The Third Natural Rubber Producers' Research Association's Rubber in Engineering Conference was held at Imperial College, London on March 29-30, 1973. Aspects of the use of Rubber in Engineering discussed included : design; creep and stress relaxation; measuring dynamic properties; new rubbers for engineers; spring insulated buildings; marine and dockside applications; helicopter bearings; low temperature performance; specifications; tyres and performance tests; and special winter tyres. Copies of the 'Proceedings' are being printed and can be ordered by writing to Mr. H. G. Rodway, Natural Rubber Producers' Research Association, 19 Buckingham Street, London WC2N 6EJ.