

THE PACKING OF RAW RUBBER

BY

A. MOORE

Introduction

Although the slump of the last few years has caused many economies to be made in almost every side of the rubber growing industry, nearly all estates continue to export their rubber packed in expensive wooden cases in spite of the fact that there are cheaper and easier methods of packing which are equally suitable.

In an article in the *Journal of the Rubber Research Institute*, Vol. 4, No. 1, July, 1932, B. J. Eaton described in some detail the use of hessian cloth and mengkuang matting as materials in which to bale raw rubber and showed that packing in wooden cases was an unnecessary expense. The use of cases however continues to be as extensive as before, so that it appears desirable to draw attention once more to the advantages of baling and also to describe some newer methods of packing rubber, notably in paper sacks, which are only just being introduced.

It is outside the scope of this article to enquire into the reasons for the insistence on estate rubber being packed in cases. It is, however, pertinent to remark that probably well over half of the rubber exported from Malaya is packed in bales, including remilled native rubber, and that large manufacturers purchasing direct prefer bales to cases.

BALING IN HESSIAN (BURLAP) OR GUNNY

Hessian and gunny are the two materials most commonly in use at the present time. Hessian is used new, being bought either direct from India or through merchants in this country, whilst the gunny used is generally old rice sacks suitably cut.

Before they can be used for wrapping bales of rubber both of these materials must be treated with a size, to increase their strength and to prevent fibres from sticking to the outside of the rubber. A suitable size consists of:—

Tapioca flour	120 lb.
Silicate of Soda	7½ „
Water	120 gallons

The above quantity is sufficient to treat 850 yards of hessian 45 inches wide, and the work of treating can be accomplished by

five labourers in one working day. The size is contained in a shallow tank fitted with rollers underneath which the hessian is drawn by winding it on a simple revolving frame, excess of size being scraped off by boards fixed at the edge of the tank. After being dipped in this way the hessian is unwound and hung out to dry before being cut into lengths suitable for wrapping bales of rubber. The whole process is very cheap and easy.

Gunny is treated in much the same way, but being already in separate pieces the work takes a little longer. Also owing to its greater thickness, gunny absorbs rather more size than does hessian.

As a further precaution against adhesion of fibres the outside of the rubber and the inside of the baling material should be dusted with talcum powder.

The cost of sufficient hessian or gunny to wrap one standard bale of raw rubber, treated with size and cut ready for use, is in round figures about 20 cents. If sheet is being baled it is often not considered necessary to strap it with steel tapes, which are required when baling crepe, but if straps are used the extra cost is 10—12 cents per bale. It is quite easy to press 250 lb. of sheet rubber into a bale of the same size and shape as a standard case holding 224 lb., which further emphasizes the economy of baling as against packing in cases.

BALING IN "GRASS" MATTING

Mats made of such materials as mengkuang palm fibre can be used for baling rubber. No treatment with size is needed, but it is advisable to dust the rubber, and the inside of the matting, with talcum. This method of baling is not greatly favoured, as it is stated that such matting does not withstand handling with hooks so well as do hessian or gunny, and in addition the packages are rather more bulky and untidy.

The cost of sufficient mengkuang matting to wrap a standard bale is about 18 cents, to which must be added the cost of straps, if these are considered necessary.

One considerable advantage which would follow the use of mengkuang matting for baling rubber would be the development of a mat-making industry amongst the natives of Malaya, who already make such mats on a small scale for their own domestic use. It is further suggested that small holders might use mats of their own making to wrap their rubber whilst taking it to the local dealer. Native sheet is very often reduced in value by being transported loose on the back of a car or a bicycle, and a wrapper of mengkuang matting, which could be used many times,

would protect it from contamination by dust and enable the owner to obtain a higher price.

BALING WITHOUT ANY WRAPPING

This method has not been widely practised and is only suitable for large consumers shipping direct to their own factories. The sheet rubber is simply made into a bale, preferably with wrapper sheets of the same quality, strapped with three or four steel tapes, and dispatched. On arrival at its destination the rubber requires to be cleaned thoroughly, so that this method of packing is acceptable only to consumers possessing adequate cleaning machinery.

BALING IN PLY-PAPER

This new baling material is only now becoming available. It consists of a number of plies of paper stuck together with latex, and it is hoped to manufacture it in this country from imported paper.

The material is surprisingly strong, and is claimed to be water-proof. A single piece of it is used to wrap a standard bale of sheet rubber, just as a parcel is wrapped, and the folded ends are further secured by sticking on to each a square piece of the ply-paper. Latex is used as an adhesive to seal the seams and ends. No stitching is required and the finished parcel is completely sealed so that no dust can enter.

The cost of this ply-paper is not yet known, but it will certainly be less than that of the usual wooden cases.

PACKING IN PAPER SACKS

The use of paper sacks for packing rubber is also a recent development, and is one which promises to become of considerable importance. In January 1934 the Rubber Research Institute packed and dispatched to London a small quantity of sheet rubber in paper sacks, and this was followed by a consignment of about 25 tons from an estate in Malacca. These consignments, and one other in which various baling materials were used, were examined on arrival by the technical staff of the London Advisory Committee for Rubber Research (Ceylon and Malaya), and as their report and conclusions are of great interest they are reproduced in full in Appendix "A".

The work of packing in paper sacks is very easy, the sheet being packed and pressed in an ordinary mould and the two halves of the paper sack slipped over the block of rubber thus obtained. The maker's standard instructions for packing in paper sacks are reproduced in Appendix "B". No mention is

made there of dusting the outside of the block of rubber with talcum, but this is very necessary as otherwise the paper might stick to the rubber (See Appendix "A").

Paper sacks are now being sold in Malaya at a cost of 25 cents for a sack to hold 112 lbs. of rubber. It is probable that if they came into general use the cost would be appreciably reduced.

PACKING IN WOODEN CASES

Everyone is familiar with the 3-ply wooden cases still commonly used for packing estate rubber, so it is not proposed to discuss them in detail. Their principal disadvantages are high cost and the danger of splinters getting into the rubber. Their principal advantages are that they completely exclude dirt and are almost water-proof.

The average cost of a case to hold 224 lb. of sheet rubber, assembled and ready for use, is in the neighbourhood of 70 cents.

On some estates up to 250 lb. of sheet rubber is packed in a case. If this is done carefully, and the rubber well pressed, there should be a saving in freight charges, but often the cases bulge so much that extra shipping charges are incurred which lessen the saving that would otherwise be made.

It might be remarked in passing that many estates packing in cases make the mistake of nailing the battens at top and bottom to the *sides* of the case. The battens should be nailed to the *ends* of the case, as this facilitates opening for the purpose of inspection and sampling.

DUSTING OF RUBBER DURING PACKING

It has been mentioned above that, when baling, the outside of the block of rubber and the inside of the wrapper should be dusted to prevent sticking.

For this purpose ordinary talcum, costing about \$40/- per ton, is quite suitable, and about two ounces is required for each 2-cwt. bale, i.e. the cost is about one quarter of a cent per bale.

The talcum is contained in a small muslin bag which is shaken and rubbed lightly over the surface of the rubber and the inside of the baling material immediately before wrapping.

Recently various small manufacturers, who are not equipped with machinery for cutting up blocks of rubber, have asked for bales or cases of rubber in which each sheet is dusted separately as it is packed. This dusting prevents massing in transit and in storage, and the sheets in each package can easily be separated by hand (see Appendix "A").

In the experimental consignments so far prepared the dusting powder used has been zinc stearate or a mixture of this with magnesium oxide. From one half to one pound of dusting powder is required to dust every sheet in 2 cwt. of rubber, and as the cost of zinc stearate is about 80 cents per pound the process is rather expensive. It can, in fact, only be practised at the express request of a consumer who is willing to pay a sufficient premium for rubber so treated.

Recently an estate near Kuala Lumpur prepared, by agreement with the purchaser, a consignment of several tons of sheet rubber packed in cases in which every sheet was specially dusted with zinc stearate. The zinc stearate was supplied by the purchaser, and it was found that 112 lb. was sufficient to dust every sheet in 11 tons of rubber. The cost of the extra labour required for dusting was estimated at \$1/- per ton of rubber, but it is considered that with improved dusting equipment both the labour and the amount of zinc stearate used could be reduced by at least one-third.

The rubber on arrival received a good report, and the premium obtained amply covered the cost of dusting.

Summary

In the appended table the approximate costs of packing rubber in various ways are summarised, together with brief remarks on any special advantages or disadvantages of each method.

To the costs of 1, 2 & 3 should be added 10—12 cents for steel straps, if the buyers demand that these be used.

Conclusions

Packing raw rubber (except such specialities as sole crepe and superfine pale crepe) in wooden cases is an unnecessary expense.

Other methods of packing can be used which are cheaper and easier and also are as good or better. This is proved by the fact that large manufacturers buying and shipping direct prefer bales to cases.

Kuala Lumpur

30th October, 1934

Method of Packing		Approximate cost of standard package 224—250 lb, excluding labour of packing	Chief Advantages	Chief Disadvantages
1	Hessian	20 cents	Cheapness	Possible penetration by dust and water. Adherence of fibres
2	Gunny	20 cents	Cheapness	Possible penetration by dust and water. Adherence of fibres
3	Mengkuan matting	18 cents	Cheapness. Material could be made locally	Not water-proof. Tears too readily
4	No wrapping of any kind	12 cents for strapping	Cheapness	Rubber gets very dirty. Unsuitable except for large manufacturers
5	Ply-paper	Not fixed	Strong and water-proof. Latex used in making material	Possibly cost will prove too high compared with (6)
6	Paper Sacks	50 cents (2 bags)	Each package 112 lb. and easily handled. Relatively cheap compared with cases. Dust proof	Paper would soften if wet
7	Wooden 3-ply cases	70 cents	Dust proof, and not easily damaged by dampness	High cost. Splinters in rubber

Appendix "A"

LONDON ADVISORY COMMITTEE FOR RUBBER RESEARCH (CEYLON AND MALAYA)

Packing Experiments

The technical staff of the London Advisory Committee has recently examined three different consignments of smoked sheet in connection with packing experiments, two of which were small-scale experiments organised by the Rubber Research Institute, Malaya, and the other a large-scale experiment organised by a member of the Rubber Growers' Association.

Two of the trials were concerned with a paper sack which it is claimed by the manufacturers is suitable for rubber. The other was concerned with different types of baling material. Several rubber manufacturers in this country are understood to be interested in the treatment of rubber with a surface lubricant and all three experiments included rubber dusted at least on the outside of the wrapping sheets.

The first consignment examined was forwarded by the Rubber Research Institute and consisted of three paper sacks containing 112 lb. each of sheet and three standard cases containing 224 lb. each. The type of paper sack used in this experiment is no longer recommended by the suppliers. The dimensions when sealed were approximately $13 \times 12 \times 30$ in., which are inconvenient for estates generally.

The new bag, the dimensions of which are $19 \times 9\frac{1}{2} \times 24$, is exactly half the size of a standard case (viz. $19 \times 19 \times 24$ in.). Each bag is now supplied in two equal sections which fit over each end of 1 cwt. of rubber compressed in the usual moulds with a plate to separate the rubber into 1 cwt. lots. The overlap of the two sections of the bag is secured with an adhesive paper strip. To open the package for sampling it is necessary to pull a red stitch which releases the sewing at one end. The sack is resealed with a strip of adhesive tape.

Although the old type of paper sack had unsuitable dimensions and was supplied in one piece the experiment was of value since

it afforded an indication of the suitability of paper sacks generally. The samples received were as follows:—

Paper Sack	Cases	Treatment
A	AX	Every sheet dusted with a mixture of one part zinc stearate and two parts magnesium oxide
B	BX	Outer wrapper sheets only dusted with powder
C	CX	No dusting

On arrival in London the rubber was examined by representatives of a London Wharf, the makers of the paper sacks, and a small rubber manufacturer in addition to the Committee's staff.

The sack (A) was torn on the top side exposing the rubber wrapping sheet over about one sixth of the area of the side, the sack (B) contained a small tear (about 2 sq. in.) on one side only, and the third sack (C) was in good condition.

Each paper package retained its original shape, and compared very favourably in this respect with rubber baled in hessian received in a previous consignment; this is probably due to the fact that the paper sacks were not subjected to such heavy pressure during transit as the bales.

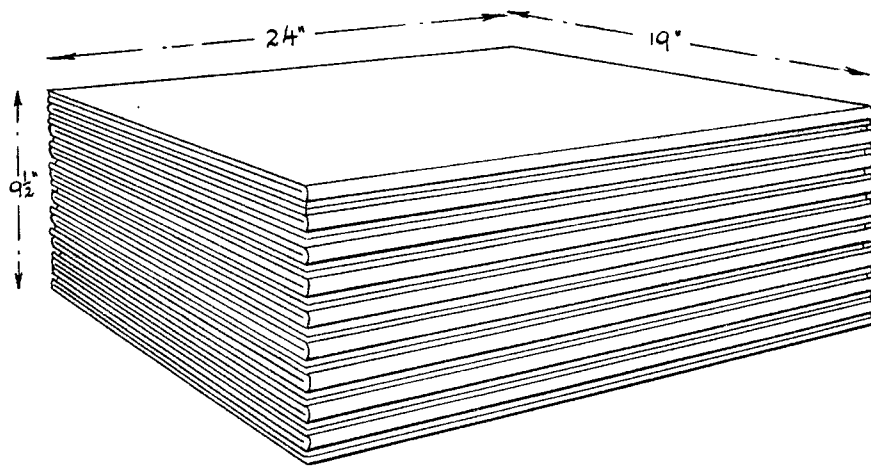
The wooden cases were all in good condition. The four battens at the upper edges of each case were nailed to the sides of the case and not to the edges of the cover as recommended by the Rubber Research Institute.

Previous information from the makers indicated that a given weight of rubber occupied about 8 per cent greater volume in a sack than in a case, but the dimensions of the sacks received showed that the volume of 112 lb. of rubber was slightly less than that of half a case.

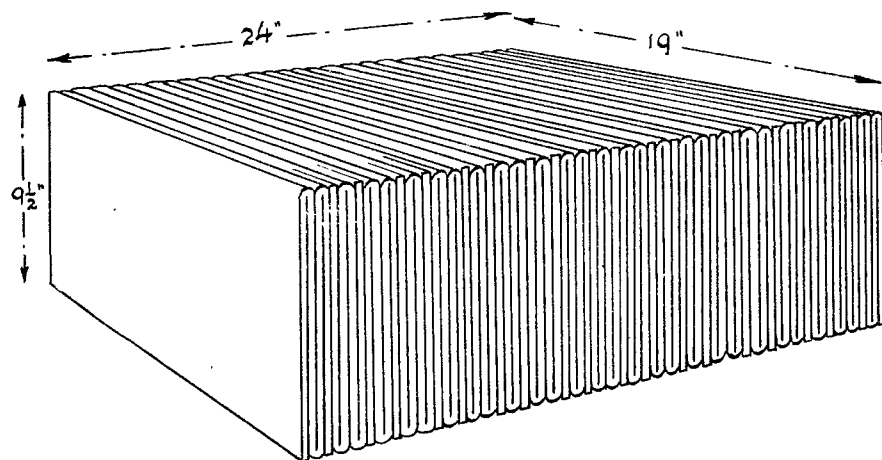
As regards ease of sampling there was little difference between the rubber in the cases and that in the paper bags. The dusting powder greatly facilitated the separation of the individual sheets but the appearance of the powder was strikingly similar to that of mould, which might prejudice the sale of the rubber on the open market. The dusting of the wrapping sheets only did not offer any advantage beyond ease of removal of the wrapper. A rubber manufacturer who had previously requested that rubber sheets should be dusted examined the consignment and was impressed by the ease with which the dusted sheets could be separated.

After opening the rubber and taking a sample from the centre in accordance with the practice of London wharves it was found

A.



B.



impossible to compress the whole of the contents into the sack again. The difficulty was accentuated by the large number of wrapping sheets employed and by the fact that they were placed in a transverse direction so that it was necessary to remove the wrapping sheets completely before sampling the rubber.

The second experiment comprised about 500 packages each containing 1 cwt. of smoked sheet in the latest type of sack and was organised by a member of the Rubber Growers' Association. The rubber was shipped to Amsterdam and then transhipped to London. The removal of the rubber to a barge was inspected in London and it was obvious that the paper sacks were much more easily handled than the cases by the dock labourers. Only one package appeared to be damaged beyond repair, although an estimated 5 per cent had minor cuts or tears.

The sampling of the rubber at a London Wharf was carried out in the presence of representatives of the Rubber Growers' Association, various rubber dealers, the makers, the technical press, and the staff of the London Advisory Committee.

The packages were easily opened by pulling the thread running along one end. Some of the rubber appeared to have been dusted on the outside with talcum powder, and was easily and cleanly removed from the packages. Those which were not dusted adhered to the paper package and were more difficult to remove. In the case of these packages it was claimed that the adhering pieces of paper could be easily removed by washing but the general experience of the staff of the London Advisory Committee indicates that considerable difficulty is entailed.

The rubber was not wrapped with wrapping sheets, which are desirable in case the paper sack becomes torn and dirt has an opportunity of penetrating between the sheets.

The sheets were more difficult to separate than rubber packed in cases. This method of packing would therefore not be popular with the wharves and with some of the smaller rubber manufacturers. It was stated however that the difficulty of sampling was due to the arrangement of the sheets which had been placed sheet upon sheet instead of end on as indicated in the diagrams opposite.

The effect of packing as in A is to compress the sheets more tightly together during transit and increase the tendency to mass. It is probable that packing as in B would reduce this tendency, in which case the principal objection to the use of paper sacks would be eliminated.

After separating the sheets and removing samples, the rubber was easily replaced in the paper sacks, which were quickly resealed.

It is evident from this experiment that the paper sack, which costs 10d. for two as compared with 1/8d to 2/0d for a wooden case, is a promising container for sheet rubber. It is desirable however to wrap the rubber with rubber wrapping sheets, to dust these on the outside with a surface lubricant and to place the rest of the sheets "end on". Apart from price the chief advantage of the paper sack is the absence of splinters and fibrous materials which tend to work their way into the mass of the rubber when it is packed in wooden cases or bales.

The third experiment consisted of four packages of baled sheet and one in a standard wooden case as follows:—

Package No	Type of package
1	Mengkuang matting strapped with metal bands
2	Hessian " " " " "
3	Gunny " " " " "
4	Strapped with metal bands only
5	Wooden case

On arrival in London the rubber was examined by representatives of one of the London wharves and of a rubber manufacturer who had previously expressed interest in baled rubber, and by the staff of the Committee.

Of the three matting materials the hessian and gunny were in good condition but the mengkuang was torn and frayed at some of the seams. All the rubber was wrapped with wrapping sheets apparently dusted with a surface lubricant which prevented the adhesion of fibrous material to the rubber. The wrapping sheets failed to cover the contents completely so that the inside sheets were exposed at the ends of the bales.

Considerable difficulty was experienced in sampling the baled rubber owing to the massing which occurred below the metal straps.

No difficulty was experienced in sampling the contents of the wooden case, but the rubber contained a considerable number of splinters which had penetrated beyond the wrapping sheets into the interior of the rubber. For this reason the rubber manufacturer's representative emphatically preferred the baled rubber. He considered that the mengkuang matting covering was the most suitable as there was more danger of fibrous material penetrating into the rubber when covered with hessian or gunny.

The rubber without covering was in a satisfactory condition, apart from the difficulty of sampling, but it is unwise to draw general conclusions from a single bale. Considerable experience with this method of packing would be required before it could be definitely approved.

The principal conclusion from the experiment is that most manufacturers would probably prefer baled rubber to rubber packed in cases but sampling constitutes a serious difficulty for baled rubber sold on the open market.

General Conclusions

(1) Paper sacks are promising containers for rubber. They have the advantage of cheapness, cleanliness and ease of handling, but it is necessary to ensure that the wrapping sheets are dusted with a surface lubricant and it yet remains to be shewn that when the sheets are placed in the package as suggested they will not mass under adverse conditions.

(2) Most manufacturers would probably prefer baled rubber to that packed in chests owing to the absence of splinters in the former. Mengkuang matting is probably cleaner than gunny or hessian, but it is necessary to dust the surface of the wrapping sheets to prevent the adhesion of fibrous materials. The use of metal straps with baled rubber causes the rubber to be extremely difficult to separate into individual sheets for sampling. The wharves and some of the smaller manufacturers therefore do not favour this method of packing.

(3) The dusting of individual sheets with a surface lubricant markedly improves ease of separation, which is an advantage to the wharves and to some of the smaller manufacturers. In some cases the lubricant eventually assumes an appearance similar to that of mould and this might prejudice the sale of the rubber on the open market. In reply to a suggestion by the Committee that the difficulty might be overcome by marking the cases so as to indicate that the rubber had been dusted with a named material, the Rubber Trade Association state that a buyer desiring to receive rubber dusted in this manner should stipulate accordingly when making a contract.

G. MARTIN
W. S. DAVEY

Imperial Institute
South Kensington, S.W.7
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Appendix "B"

INSTRUCTIONS FOR BALING, PACKING AND SEALING SMOKED SHEET RUBBER IN 1-CWT. PAPER SACKS

(1) *Shape and Capacity.*—It will be noted that the shape and capacity of our 1-cwt. paper package when sealed is exactly half the size of the $19 \times 19 \times 24$ standard case, namely $19 \times 9\frac{1}{2} \times 24$. Thus, for shipping purposes the cubic capacity of two of these 1-cwt. packages is the same as the present standard 2-cwt. case.

(2) *Method of baling Rubber before packing.*—It is anticipated that the existing moulds now in use on the estates can be adapted and utilised for the method applicable to packing our 1-cwt. sacks as follows:

- (a) The mould used for packing a case $19 \times 19 \times 24$ would require to be fitted with a division plate to produce two bales $19 \times 9\frac{1}{2} \times 24$.
- (b) The rubber sheets are folded and compressed directly into the moulds. The baled rubber is then removed in two sections from the moulds and packed into 1-cwt. paper sacks as hereinafter described.
- (c) To remove the rubber bales from the mould it would probably be necessary to provide for one of the sides of the mould, as well as the division plate, to be removable. Actually it is possible to dislodge the bales from a mould laid on its sides (which is not fitted with a bottom) by hammering on one end of each of the bales.
- (d) Immediately the bales are removed from the mould they must be packed. This packing should be effected promptly before any appreciable expansion of the rubber occurs.
- (e) The next operation is to pack each 1-cwt. bale into the paper sack, and this is extremely expeditious and simple. The 4-ply sack is made in two sections of exactly the same size and shape to conform to that of the rubber bale, each of which is fitted over either end of the bale. Each section is made sufficiently long to provide for a 6 in. to 8 in. overlap, so that the end of each sack fits well over that of the other. The overlap of the two sections is then secured with any suitable "Latex" adhesive, and finally the seam is covered and protected with strong gum tape.

(3) A novel feature of this type of sack is that each end is sewn with a chain stitch, the running end of the under-thread being coloured red. To facilitate opening of the package for sampling purposes at port of discharge, it is only necessary to pull this red stitch which releases the sewing. To re-seal, a strip of strong gum tape can be used. As it is only a matter of sticking and holding in position the pre-folded end of the sack, this method of sealing will be found very effective and sufficiently strong for the final transport of the package to the buyer's warehouse.