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DEVELOPMENT OF SECONDARY WOOD PROCESSING INDUSTRIES

DP/GUY/86/005

THE REPUBLIC OF GUYANA

Technical report: Assistance in sawdoctoring and tool maintenance*

Prepared for the Government of the Republic of Guyana
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of G.A. Woods
Sawdoctoring and tool maintenance expert

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Vienna

* This document has not been edited.

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1. INTRODUCTION

- 1.1 The expert G.A.Woods arrived in Guyana on the 17th January 1990 for the second part of a split mission this part of which was for 2.8 months under UNDP/UNIDO Project DP/GUY/86/005 Assistance in sawdoctoring and tool maintenance. His duties are given in Appendix I.
- 1.2 During the first part of the mission undertaken in November 1987 the expert surveyed the sawmilling and wood manufacturing industries to ascertain the needs of a Servicing Centre to be set up at the Product Development Workshop of the Forestry Commission in Georgetown.
- 1.3 The existing toolroom of the Product Development Workshop was poorly equipped and in a building not suitable for expansion. A bigger and far superior building was found and it was agreed to use this for the proposed new toolroom and sawdoctor's workshop.
- 1.4 During this first three weeks mission several machines and a lot of ancillary equipment were found lying around in stores not in use for various reasons, details of which were given in the expert's report for that part of the mission. These machines and equipment were to be transferred to the new workshop and thoroughly cleaned ready for use when the expert returned.
- 1.5 The expert prepared specifications for five major new machines, four small machines and various items of ancillary equipment plus spare parts and grinding wheels for some of the existing equipment. These machines and various items of equipment have been supplied by UNIDO and installed in the new building.
- 1.6 Although the Forestry Commission's staff checked the equipment against a list as supplied they did not check it against the list of items recommended by the expert in his report. Unfortunately the two page list of grinding wheels for use on the machinery were not supplied although the new machines had test wheels given with each machine. This still left some existing old machines without wheels and not sufficient quantity and variety of wheels to commence extensive training or serious saw servicing.
- 1.7 On the 19th January 1990 UNDP Georgetown transmitted copies of the list of grinding wheels to UNIDO headquarters asking if anything could be done to rectify the situation.

- 1.8 Two other problems were encountered which hampered progress namely; daily power cuts at the workshop and a scarcity of cutting agents at the Commission's workshop available for sharpening, for training and machine testing. This led to the resident representative Mr. J.L.Larrabure on the 24th January 1990 asking the expert to prepare the same day a quick factual report on the situation a copy of which is included in Appendix 2.
- 1.9 The expert was called to attend a meeting between UNDP, the Guyana Manufacturers' Association (G.M.A.) and the Forestry Commission on the 26th January 1990 to discuss the possibility of the G.M.A. participating in or taking over the running of the saw servicing centre. The Government representative did not turn up so the meeting was cancelled.
- 1.10 On Monday 29th January 1990 at a meeting between UNDP and the Forest Products Association (F.P.A.) it was decided that the expert would be more gainfully employed visiting the association's sawmills and assisting them with whatever sawdoctoring problems they had for a period of approximately four weeks.
- 1.11 On completion of visiting sawmills in the Bartica area and whilst in Georgetown for the weekend the expert was notified of a meeting with the Government set for the following Monday 12th February. At this meeting the Executive Chairman Cde. W.King of the Guyana Natural Resources Agency under whom the Forest Industries Development Unit falls expressed his concern that the main objectives of the project were not being implemented whilst the expert was away working in the sawmills; i.e. setting up and training staff for a Servicing Centre. It was therefore decided to curtail these visits on completion of one more week's work to a region for which arrangements had already been made; after which the remaining six weeks would be concentrated on setting up the Servicing Centre.
- 1.12 At this meeting the expert took the opportunity to request that something should be done to acquire a standby generator to supply electricity to at least some of the machines during the frequent power cuts.
- 1.13 Requests continued to come in for the expert to visit sawmills to look at their problems therefore local sawmills in Georgetown were visited during periods when there was no electricity in the Servicing Centre and sawmills further afield were accommodated at weekends.

THE SERVICE CENTRE

- 2.1 Most of the existing machinery and equipment had been transferred to the new workshop by the time the expert returned on the 17th January 1990 but it had not been cleaned of rust and dirt therefore most of the first two weeks were spent doing this, bringing over some remaining items and making adjustments to the positioning of some machines.
- 2.2 The Wooden Framesaw Blade Tensioning Bench had been made to the drawings provided and apart from the final alignment of the levelling plate and tensioning roller was complete and well made.
- 2.3 The Wooden Cleaning and Stelliteing Bench plus the Wide Bandsaw Blade Tensioning Bench had been constructed but no rollers or the necessary steel brackets had been made. This is not a serious problem since it is not expected that wide bandsaw blades will be brought in for servicing; their inclusion in the workshop plan was more with a view to training and as an example of easily made benches which sawmillers could copy.
- 2.4 The Wide Bandsaw Blade Welding Clamp Trolley had been made in wood but no rubber castors are available to make it easily portable and facilitate its positioning astride the blade being welded. Again this was an existing piece of equipment and is not expected to be used for servicing but is always extremely useful for training purposes.
- 2.5 Actually, apart from not cleaning up the old machinery properly the staff at the Government Workshop had done quite a good job of preparing the workshop ready for the expert's return.

NEW MACHINERY AND EQUIPMENT

- 3.1 All the items of machinery and equipment as recommended by the expert had been safely delivered and checked against a list as supplied. Unfortunately this did not show up any items which were not supplied which led to a problem with grinding wheels for some of the machines not being supplied. Two other small items were not supplied which were the two rubber or plastic backing pads for the angle grinders and the small Circular Saw Blade Mounting attachment N33.5 for blades with small bores.
- 3.2 All the items supplied are of top quality and ideally suited to servicing blades and tools and for manufacturing industries and if properly maintained and cared for should give many years of trouble-free service. It must be emphasized that all grinding machinery MUST be kept clean at all times, for if grinding dust is allowed to accumulate on moving parts of the machine these parts will grind themselves away very quickly with loss of accuracy in the machine and needless bills for repairs or replacement parts.
- 3.3 All the machines were tested as soon as blades for sharpening and electricity were available and all proved to be in perfect working order. The only disappointment being that the Vollmer Cana/e Automatic Sharpening machine had not been fitted with the four cams for different tooth profiles as specified by the expert. For some unknown reason Vollmer's choice of cams is poor and invariably include two cams for straight backed teeth which are almost identical literally reducing the machine's capability to three tooth shapes instead of four. Different cams can of course be fitted but it means stripping the machine right down almost to the last component to get at and remove the camshaft.
- 3.4 UNIDO did manage to procure some of the grinding wheels but they did not arrive in Guyana until mid March and were not cleared through customs and delivered to the Forestry Commission until the afternoon of the 23rd March i.e. only two working days remaining of the expert's visit.

SERVICE CENTRE STAFF TRAINING

- 4.1 Two members of the Forestry Commission's staff were sent to U.K. for a training period of two months. Tony Joseph who was recommended by the expert for overseas training is continuing his training and is working as a sawdoctor in the Servicing Centre whilst Rishton Welcome selected by the Government works in a supervisory capacity and has not had time to participate in the training on the new machinery. This is a pity but his previous training in U.K. will not be completely wasted if he were to manage the Servicing Centre, if and when the volume of work warrants such an appointment.
- 4.2 One other young man Martin Smith, who had no previous experience, was made available for training and in the six weeks available for training i.e. after the two weeks spent on installation and two weeks visiting the sawmills. He made satisfactory progress.
- 4.3 About halfway through the ten weeks mission the expert discovered that the Forestry Commission were interviewing experienced sawdoctors with the intention of employing one or even two additional staff for the Servicing Centre. Although the expert expressed the opinion that extra staff were not necessary with the present volume of work, he also said that if appointments were to be made they should be made quickly so that at least some training could be given to the new staff. The expert was surprised that he was not invited to participate at the interviews to at least ask some technical questions. On Friday 23rd March with only three working days before the expert's departure a Mr. J. Clement was appointed and arrived at the workshop. Although Mr. Clement has had 35 years experience working in Sawmills throughout Guyana it was soon apparent that he knew little about servicing tools for the secondary wood processing industry and nothing of using metric units of measure, vital when most of the machines are graduated in metric units. This was extremely embarrassing for the expert and may prove even more embarrassing for the Commission's Management since it would appear that Mr. Clement is to be the senior sawdoctor. Although Tony Joseph has not had so much experience, at least he is capable of using all the machines and carrying out all normal servicing for the secondary wood processing industry for which the Servicing Centre was established.

- 4.4 Even though Forestry Commission have had over two years to prepare for the installation and training on the machinery at the Servicing Centre a back-up electricity supply was never installed. This virtually HALVED the time when the machines could be used for training because of power cuts. These power cuts were not time tabled therefore planning was impossible. On top of this transport to visit factories and sawmills at such times when there was no electricity was seldom available causing much frustration and unavoidable time wasting.
- 4.5. The offer of the expert's four Training Manuals on Sawdoctoring subjects for reproduction was never taken up by the Forestry Commission.
- 4.6. Although the training of the Servicing Centre's staff was not entirely satisfactory the two younger members namely Tony Joseph and Martin Smith should be able to cope with most normal requests for tool maintenance from the secondary wood processing industries plus some other work from the sawmills with limited equipment, for example framesaw blade tensioning which was deliberately covered by the expert. If the Servicing Centre fails it should not be because of inadequate training but simply by mismanagement.

S E M I N A R S

- 5.1 In Guyana, as in most countries throughout the world, sawdoctor training has been inadequate. This causes serious problems throughout the industry since if the blades are not properly maintained the whole sawmill's efficiency is reduced considerably. First cutting speeds are reduced which not only reduces the throughput of logs but often causes premature blunting of teeth with consequent increases in downtime for blade changing etc. Secondly the quality and accuracy of cutting is often so poor that recovery from the logs is reduced by as much as ten per cent. If planing and moulding is subsequently carried out in the sawmill this too is adversely affected by feeding the machines with under and oversized material. Last but not least, cost of replacement blades which are damaged indirectly by incorrect maintenance may easily be doubled which is a serious problem when foreign currency is already difficult to find.
- 5.2 Obviously a few hours chalk and talk is not going to alter the situation but it is the best that can be undertaken in the short time available.
- 5.3 By inviting the management to one of the two seminars it is hoped that they will at least understand more fully the reasons behind many of their sawing problems and maybe instrumental in implementing higher standards of blade and machine maintenance in the sawmills.
- 5.4 The contents of the lectures for both seminars concentrated on the common problems found during the visits to the sawmills by the expert, after which the participants were invited to ask questions on any relevant subject.
- 5.5 The afternoon session for the managers was concluded with a visit to the workshop of the Servicing Centre where they were shown around and some of the machinery demonstrated by the staff.
- 5.6 The seminar for the sawdoctor technicians comprised a longer three hour session of theory in the morning and a full afternoon of practical demonstrations by the expert in the workshop at the Servicing Centre.

5.7 Although the seminars were reasonably successful, especially for the technicians, the numbers attending were very disappointing with only eight managers attending from five sawmills. This, the expert feels, was not because of a lack of interest but because of a complete lack of advertising other than the leaflets sent out by the Forestry Commission.

5.8 Total numbers attending were:
 First seminar 26
 Second seminar 42

5.9 A group of 7 University Forestry students together with their tutor Miss L.L.Kelly attended the second seminar.

S A W M I L L V I S I T S

- 6.1 At a meeting on the 29th January 1990 at the U.N.D.P. office with the Forest Products Association (F.P.A.) it was decided that the expert would be more gainfully employed by visiting the Association's sawmills giving advice on sawdoctoring problems. This was for a period of four weeks during which time it was hoped that UNIDO could do something regarding the missing grinding wheels and the Forestry Commission could do something about the lack of electricity in the workshop the latter of which was seriously holding up the training programme.
- 6.2 At a later meeting with government the period of four weeks was reduced to approximately two weeks. See Introduction 1.11. The actual period spent with the sawmills was 31st January - 9th February inclusive, also working Saturday and Sunday 3rd and 4th February, then again 13th - 15th February inclusive in different areas.
- 6.3 In all seventeen sawmills were visited and in thirteen various periods of time were spent helping with problems associated with the maintenance of the blades or the machinery on which the blades were sharpened or used. Unfortunately four of the mills visited had little or no sawdoctoring equipment therefore the expert could not do much to help. A list of sawmills visited is given in Appendix 3.
- 6.4 As is usual the sawmills using wide bandsaw blades had the most problems since this type of blade needs much more skill and equipment to maintain it satisfactorily.
- 6.5 The management of the Government Sawmill Demerara Woods at Mabura Hill made a request for the expert to visit their mill to look at a few problems. In order not to interfere with the work of the Servicing Centre the expert agreed to make the visit over the weekend Friday to Sunday 2nd to 4th February. See separate report Appendix 4.
- 6.6 The Mazaharally Sawmill at Skull Point Mazaruni were still having trouble with their log bandmill blades running back on the pulleys. The expert had advised on the details for grinding having contacted the manufacturer in U.K. for their recommended crown for the grinding but no-one was sure if they had done the grinding correctly. Since the sawmill's production was being seriously reduced by their main machine being out of action the expert agreed to take a look at the problem on the first available weekend which was 10th February.

- 6.7 The sawdoctor from Caribbean Resources Limited called to see the expert for some advice on the reason for their wide bandsaw blades on the Band Resaw machines breaking at the welded joint. The expert agreed to go to the sawmill at the first opportunity available during an electricity power-cut at the Servicing Centre. This occurred on Tuesday 6th March and several faults were found with both the welding technique used and on the machines on which the blades were used. The expert demonstrated his method of welding the 150mm wide blades which proved to be much stronger than the technique previously used at the sawmill. He also calculated the correct STRAIN to be used and gave the head sawdoctor a chart of weights to use together with a few relevant notes as shown in Appendix 5.

RECOMMENDATIONS FOR THE FUTURE

7.1 Most important for the future of the Servicing Centre is to ensure that it will continue to function. This may seem an obvious statement to make but it is a sad fact that all too often aid projects which are satisfactorily established cease to function after the technical assistance personnel have left. The following pitfalls must be avoided if the success of the project is to be guaranteed

(a) Management of the Guyana Forestry Commission's Workshop is extremely poor, one only has to look at the state of the Woodworking Workshop and its machinery to see this and unless the Servicing Centre is MANAGED properly potential customers will be deterred if there are delays in executing the work or if the work is not to the required standard.

(b) A permanent standby electricity supply is a MUST otherwise no meaningful times when customers' work can be collected can be given and often customers will require work to be done quickly since they may not have a replacement tool to fall back on.

(c) The prices which are charged will have to be constantly monitored and changed when necessary to keep in line with a reasonable percentage of the new replacement cost of tooling.

(d) Consumable items such as grinding wheels, tungsten carbide tips etc. will all need replacing at the right time and since nearly all the items cannot be purchased locally then they will have to be ordered from abroad well in advance and the necessary foreign currency found from somewhere.

(e) The staff of the Servicing Centre will have to be financially rewarded properly, for unless they are there will be no incentive to turn out sufficient work for the whole thing to be viable.

(f) The skilled sawdoctoring staff should not be involved with paperwork. They cannot do both and their skills are too valuable to waste.

(g) A telephone (which works) must be made available so that customers can make enquiries about the servicing.

- 7.2 These are the key pitfalls that the expert feels could impact upon the project. It is hoped however that by giving due consideration steps will be taken to avoid them and that the venture will flourish.
- 7.3 There has been much confusion concerning the training of sawdoctors for the sawmilling industry in Guyana. In fact the industry had been told that this is what the expert was returning to Guyana to do. This was unfortunate but it is hoped that the visits made by the expert to the sawmills and the two seminars held will go some way to alleviate their obvious disappointment.
- 7.4 Certainly there is a desperate need for sawdoctor training, ideally in a training centre where the machinery can be relied upon to function properly but also ideally where the blades can be tested under sawmill conditions.
- 7.5 Although the Servicing Centre has some machinery and equipment suitable for such training, it is NOT and was never intended to have the necessary machinery for maintaining the sawmilling side of the woodworking industry. If it was decided to add to the facilities and use the Centre for short-term training then there is sufficient space in the workshop and already some appropriate equipment which would reduce the cost of such a venture.
- 7.6 Obviously numbers trained at any one time and the total number requiring training would determine whether one or more sets of equipment would be necessary. For single persons attending to upgrade existing skills the additional equipment which would be needed would be for Wide Bandsaw blade maintenance i.e. One Stretcher Rolls, one Automatic Sharpening Machine, one Stellite Side Grinding machine and a few extra hand tools. The equipment for Circular and Framesaws already exists.
- 7.7 Of course a skilled instructor would be required who could perhaps spend his time between formal training at the Centre and trouble-shooting in the sawmills and on-site training.
- 7.8 Finally if there are funds available the expert recommends that the full list of grinding wheels which were requested in the first phase of the project should be supplied. This, as originally intended, will give the Centre a good start and time to generate more funds for future purchases of consumable supplies. Note: Approximately one third of the wheels arrived on the 23rd March but the four wheels for the Grifo GM1000 Straight-knife Grinding machine were not suitable and will now be used on the Tool & Cutter Grinder. The wheels for the Straight Knife Grinding machine should be re-ordered to the following specification :-
AA46-E-12-VH for Wet Grinding.

1 October 1986

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

U N I D O

Project for the Government of Guyana

Development of Secondary Wood Processing Industries

JOB DESCRIPTION

DP/GUY/86/055/11-02/J-13101

Post title Sawdoctoring Expert.
Duration: 3.5 m/m (split mission)
 First Phase 3 weeks
 Second Phase 11 weeks

Date required: As soon as possible

Duty Station: Georgetown

Purpose of Project:

- To familiarize the private sector entrepreneurs with recent developments in the furniture and joinery industries sector, by organizing a 3-week seminar.
- To provide a service centre for sawdoctoring and tool maintenance at the Forestry Commission.
- To train local staff in the operation of the service centre and improve sawdoctoring and tool maintenance skills.

Duties: During the two phases of his split mission, the consultant will be attached to the Guyana Forestry Commission and will work in close cooperation with the counterpart staff and other internationally recruited consultants.

Phase 1: Preparatory mission:

The consultant will finalize the technical specifications of equipment for and space requirements of the service centre for sawdoctoring and tool maintenance. In particular he is expected to:

1. Prepare a survey of the needs of selected wood processing enterprises in the Georgetown area in terms of sawdoctoring and tool maintenance.
2. Obtain from the above manufacturers the information on the type of, frequency and volume of services they wish to obtain from the centre and an indication on the type and technical specifications of woodworking tools currently used by them or that they foresee to introduce in the future.

.../

Applications and communications regarding this Job Description should be sent to:

Project Personnel Recruitment Section, Industrial Operations Division
UNIDO, VIENNA INTERNATIONAL CENTRE, P. O. BOX 300, VIENNA, AUSTRIA

3. On the basis of the above, draw-up a list giving the full technical specifications of the equipment needed for the establishment of a sawdoctoring and tool maintenance centre. This list must clearly differentiate between those items which have to be imported and those to be manufactured locally by the project.
4. Prepare or provide all the manufacturing drawings and specifications of materials of items which have to be manufactured locally.
5. Propose the layout for the centre.
6. Based on this layout select the most suitable building.
7. Propose a training course for the fellowship holders and assist the authorities in selecting the fellows.
8. Prepare a short interim technical report setting out the findings of his preparatory mission and his recommendations to the Government on the tasks to be completed by the counterpart agency and the tasks to be completed by them prior to his return mission.

Phase 2: Setting up of the Centre and training of local staff.

During the second phase of his mission, he will set up the sawdoctoring and tool maintenance centre and train local staff. In particular he is expected to:

1. Assist in and supervise the installation and start up of the equipment according to the layout.
2. Train counterpart personnel in the above duties and in the operation and maintenance of the installed equipment.
3. Prepare basic material for use as reference material for the sawdoctors from the industry using the material compiled under 2 above.
4. Conduct a short training seminar for the local sawdoctoring and tool maintenance staff from the industry to ensure that they know the basics and apply these principles in their work.
5. Prepare a technical report setting out the achievements of the project as well as recommendations to the Government for future action by them and the industry.

Qualifications: Specialist in sawdocking with specific experience in tool room equipment selection, layout and set up of tool maintenance centres as well as in preparing and conducting training courses in this field. Experience in developing countries desirable.

Language: English

Background
Information:

Guyana is rich in timber resources. Its accessible tropical forest area extends over approximately 184,000 km² and includes dozens of hardwood species. Its commercial forest volume is estimated at nearly 100 million cubic meters. However, forests in Guyana have not been intensively exploited. They still play a very minor role in the economy. Guyana's main wooden products are roundwood, sawn logs and veneer logs, and sawn wood. In 1981, their total production was estimated at 637,000 cubic meters, of which approximately 12% were exported for a total value of US\$ 9.8 million (FAO estimates). In 1980, the timber industry's contribution to GNP was only approximately 2.5% and over the period 1974-78, exports provided 3.5% of the foreign exchange earnings of the country. It is worthwhile noting that the balance of trade for "Forest Products" over the decade 1970-80 was slightly negative. No statistics exist on production and foreign trade of furniture, joinery and other manufactured wooden products.

In order to stimulate the exploitation of its rich timber resources on a more intensive basis, the Government permits the export of logs of secondary species to help gain their acceptance in importing countries. It also promotes the production of processed goods to supply both the domestic and export markets. To reach this objective, improvement is needed in the fields of product design, production technology, productivity and management. Recommendations for management and technicians as well as for the facilities for kiln drying and machine and tool maintenance were made by Mr. D. Cody serving as an expert in furniture production under project SI/GUY/84/801. Wood drying facilities have already been provided under project SI/GUY/84/802.

A P P E N D I X 2

Juan-Luis Larrabure
Resident Representative

25 January, 1990
GUY/86/005

G. A. Woods, UNIDO Sawdoctoring Expert

Preliminary report on the state of Sawdoctoring Facilities and the Wood Processing Machinery at the Guyana Forestry Commission's Products Development Workshops.

1.1 SAWDOCTORING WORKSHOP;

All the new sawdoctoring machinery and ancillary equipment has been received and satisfactorily installed in the new workshop with the exception of spare grinding wheels which have not been supplied as requested. UNIDO have been informed of this by FAX on Friday 19th January 1990 but so far have not yet replied.

The estimate cost to UNIDO for this equipment is U.S.\$50,000.

- 1.2 During the first phase of the expert's mission two years ago, he found an estimated U.S.\$56,000. of equipment existing at the Commission's workshop most of which was not in use and deteriorating and rusting in various stores.

Most of this equipment has been moved into the workshop as requested but has not been cleaned of rust and dirt ready for use on the expert's return. This is now being done but is wasting valuable time.

- 1.3 Although the expert cannot foresee any problems with the new machinery supplied by UNIDO so far he has only been able to test two of the six machines mainly because the Commission's workshop cannot provide the necessary tools for sharpening.

2.1 PRODUCTS WORKSHOP

It would appear that the Commission's workshop has no spare cutting agents (saw blades, tools, etc.) for their woodworking machinery as the expert is having to wait until the tools in use are removed from the machine before he can use them to test the new sharpening machinery. This is an extremely sad situation when the workshop should be able to generate enough funds from manufactured products to be able to more than replace spare parts and cutting agents.

- 2.2 Although the expert is not involved with the machinery in the Products Workshop it would appear that all the machinery is in poor condition through lack of maintenance and spare parts. Approximately 50% of the machines are broken down and not in use.
- 2.3 It is sad to see the deterioration which has taken place in two years since the expert was last here which was not good then but is now very bad indeed.

3.1 SAWDOCTOR TRAINING

Two of the Commission's staff have been to U.K. on a two month basic training course but one is working as a supervisor and it is doubtful if he will actually work in the sawdoctors' workshop.

It must also be pointed out that it is usual to serve a four year apprenticeship to be able to assimilate all the required skills.

- 3.2 Because of this it is essential that as much of the nine remaining weeks of the expert's mission should be spent training staff to run the workshop as a SERVICING CENTRE for local industry, who in the main have not the machinery to maintain their own cutting agents satisfactorily.
- 3.3 It is, in the expert's opinion, essential that the sawdoctoring machinery and equipment is utilised for a Servicing Centre generating its own funds so as to be self sufficient.
- 3.4 The expert has written four training manuals on sawdoctoring subjects which would be extremely useful for future reference but there is a lot of typing and drawings required if they are to be reproduced for distribution locally.

A P P E N D I X 3

List of Sawmills Visited

1.	Region 7	Guyana Sawmills Ltd.	Bartica
2.	" "	Willems Timber & Trading Co. Ltd.	Kaow Island
3.	" "	Nagasar Sawh Ltd	Bartica
4.	" "	A. Mazaharally & Sons Ltd.	Skull Point Mazaruni
5.	Region 2	Supenaam Sawmill Ltd.	Supenaam Essequibo River.
6.	" "	A. Mazaharally & Sons Ltd.	Kwebanna
7.	Region 6	Ameerally Sawmill	New Amsterdam Berbice
8.	" "	J & Z Sawh	C r a b w o o d Creek, Corentyne.
9.	" "	Road End Sawmill	" "
10.	" "	Deen's Sawmill	" "
11.	" "	Ally Khan Sawmill Ltd.	" "
12.	" "	N & F Shaffeealah	" "
13.	" "	Zaladin Lumber Ltd.	" "
14.	" "	Baianauth Sawmill Ltd.	" "
15.	Region 3	Demerara Woods Ltd.	Mabura Hill
16.	" 4	Toolsie Persaud Ltd.	Georgetown
17.	" "	Caribbean Resources Ltd.	"

A P P E N D I X 4

REPORT ON A VISIT TO DEMERARA WOODS LIMITED - MABURA HILL

INTRODUCTION

The expert Mr. G.A.Woods, at the request of Mr. L. Welcome, Production Manager, made a visit to the Government Sawmill on the weekend 3rd and 4th March 1990 leaving Georgetown Friday afternoon and returning late Sunday evening. The expert was asked to look into the reasons for the Wide Bandsaw Blades (W.B.B.) cracking. Although one and a half working days is far too little to be able to solve such a problem, which can only be corrected by a process of elimination, working to correct numerous small faults, the following observations may help to solve the problem. Other faults in the sawdoctoring were found and a brief summary and recommendations for improvements are as follows:-

FAULTS APPERTAINING TO THE CRACKING PROBLEM

Fault 1. Log Bandmill pulleys have bumps on their curved surfaces i.e. two (2) out of the four (4) pulleys.

Remedy 1. Use a coarse abrasive block or old grinding wheel and try to hone down these high spots.

Fault 2. Blade speed on the Log Bandmills is too high for the feed speed used.

Remedy 2. Slow down to the lowest speed using the gearbox provided.

Fault 3. Sawyers would appear to be running blades for a set period of time even after blades are blunt and feed speeds have to be slowed down so that the blade can last for four hours.

Remedy 3. Blades can blunt very quickly for all sorts of reasons such as cutting some dirt, whilst at other times they may retain their sharpness for a very long period. The sawyers must learn to feed their machines at the fastest speed which will not force the blade back onto the pulleys. The sawdust produced should be coarse and NOT like powder. As soon as he has to slow down from this correct feed speed the blade is becoming BLUNT and should be changed. If the sawyer cannot be relied upon to detect the blunting of the teeth then management should insist that blades are changed every two hours for at least a period of say two weeks to prove whether or not over-running of the blade is causing the cracks.

Fault 4. W.B.B. tensioning is not good enough. Blades examined had tight and loose places, in other words the tension was not even. This will cause overstressing in parts of the blade and will definitely contribute to cracking.

Remedy 4. Spend more time tensioning and gradually try to get all blades as near perfect as possible. Use a 54ft. or 60ft. gauge for the Log Bandmill blades which should show light beneath when pressed GENTLY but should fit perfectly with no light showing when pressed down HARD.

Fault 5. The existing gauges are worn and need truing up.

Remedy 5. Purchase new C & C (Convexed and Concaved) master gauges size 36, 48, and 60feet diameter to be used only as patterns to true-up working gauges which are C & S (Convexed and Straight). These four sizes should cover the needs of all the blades in use, i.e. Log Bandmill, Band Resaws and Framesaw Blades.

Fault 6. Nobody seems to know what is the CORRECT STRAIN to use for the various sizes of W.B.B. used on the Log Bandmills. This is the first thing to correct in the process of elimination for other things such as tensioning rely on this being correct.

Remedy 6. A strain of 7kg/mm^2 or $10,000\text{ lb/in}^2$ is required and the expert will make the necessary calculations if management can provide machine detail appertaining to the straining mechanism hopefully to be found in the Canali manual which was not available at the weekend.

Finally on the subject of cracking, it could be that the number of skilled sawdoctors is inadequate to maintain properly the number of W.B.B. required each day. At least two skilled sawdoctors are required just for the tensioning process alone WORKING FULL TIME on this most important work.

OTHER FAULTS

Fault 7. The edger Circular Saw Blades (C.S.B.) have too small a tooth pitch resulting in a poor tooth bite and rapid blunting.

Remedy 7. Test the set of four blades we have altered by removing every other tooth and if successful change the remaining sets and in future order blades with a 50mm. tooth pitch. Note: The 68mm. pitch which results from removing every other tooth is a little too difficult to sharpen especially since the C.S.B. sharpening machine is severely worn and not working smoothly.

Fault 8. The same C.S.B. and many others in use have too sharp a gullet resulting in blades cracking.

Remedy 8. Increase the radius of the gullets and also change from straight back tooth shape to a stronger round back shape.

Fault 9. The method of applying "Stellite" to the W.B.B. and Framesaw blades (F.B.) teeth was wrong resulting in most of the stellite running down to the bottom of the swaged cup leaving none or very little at the tip of the teeth where it is most needed.

Remedy 9. Practice the new technique as demonstrated starting at the bottom of the swage cup and DRAWING OUT the molten stellite to the tip or cutting edge where it is allowed to cool slightly before cutting off with the flame.

Fault 10. Side Grinding angles can be reduced to give longer stellite life and smoother sawn surfaces.

Remedy 10. Use three degree radial and three degree tangential settings and not five degree.

Fault 11. Welding technique was incorrect. The flame should not point inwards onto the blade when welding cracks.

Remedy 11. Point the torch and flame out away from the centre of the blade and start welding at the base of the crack out to the edge as demonstrated.

Fault 12. Several of the machines used in the sawdoctors' workshop are in need of a good overhaul including some spare parts.

Remedy 12. After the machines are repaired, insist on all abrasive dust being brushed off EVERY TIME a new blade is put on the machine for sharpening. Also wipe off any surplus oil or grease after oiling or greasing as this attracts abrasive dust from the grinding wheels and will grind away any moving parts on the machine. Each grinder should have its own paint brush for this very important work. The Armstrong Stretcher Rolls need regrinding. If done in your own workshop as explained use a radius of 250mm. making sure that the pivot is exactly opposite the centre of the roller being ground. It is also necessary to grind each PAIR of rollers the same way round as they will be replaced into the machine and make sure they are ground to the same diameter exactly.

Fault 13. In the tool grinding room attached to the moulding shop, two things were noticed in the short time spent there. The machines were not kept clean which will result in premature wear and the need for replacement parts. The coolant on the Wadkin Profile Grinder was used INCORRECTLY, i.e. to cool down a HOT cutter instead of keeping the cutter cool during grinding. This could cause the H.S.S. cutters to crack.

Remedy 13. There seems to be an urgent need for a selection of grinding wheels for the Profile Grinder so that constant dressing of one wheel to new shapes can be avoided. Some thin 1.6 mm and 2 mm Resin Bonded Cut-Off Wheels would be useful with a specification of A80-TB36 and A60-TB36 or similar. Please note that Vollmer and Wadkin do not make grinding wheels. Manufacturers give large discounts for quantity so try getting quotations direct making sure that you give sizes, specifications and use.

You could try Abrafact Limited Beulah Road, SHEFFIELD S.62 AR. UK who make a good wheel for saw sharpening specification: DA46/60-07.5-V as well as a full range of other wheels which should cover all your requirements. Alternatively, you could try Carborundum Company and Norton Grinding Wheels both in the U.S.A. which would certainly have grinding wheels suitable for the sawmilling/woodworking industries.

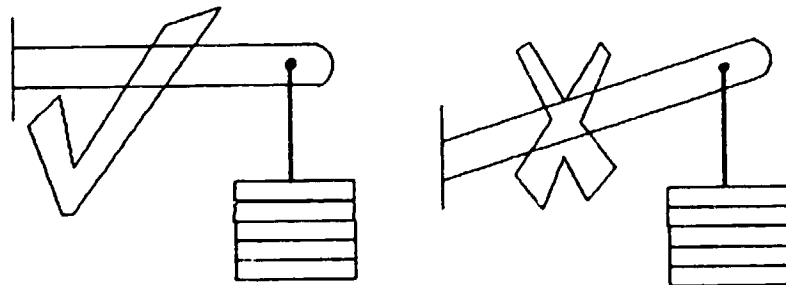
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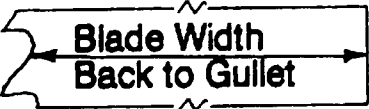
Brief Report on a Visit to Caribbean Resources Limited
Sawmill and Woodworking Complex - Georgetown.

INTRODUCTION:-

Several reasons were found which could be causing the band resaw blades to be breaking on the welded joint, these are as follows:

- a) Welding technique can be improved using the technique demonstrated by Mr. G.A.Woods.
- b) The STRAIN on the machines must be correct for the size of blade in use. It is suggested that the chart provided by Mr. Woods should be painted on the machines for the operator to work to, see below.
- c) The seventeen gauge blades in use are TOO THICK for the size of pulleys. This will have a tendency to cause cracks in the gullets and of course at the welded joint. The MAXIMUM recommended thickness is the pulley diameter divided by one hundred. In this case 48 inches divided by 100 equals 0.48 inches or 19 gauge.
- d) One of the two Band Resaw machine's straining mechanism is faulty. This should be stripped down and corrected including re-grinding the two knife edges.
- e) The lever arm of the straining mechanism should only be raised to the HORIZONTAL position, any higher will NOT increase the amount of strain and will adversely affect the working of the mechanism.



 Blade Width Back to Gullet	Weight as shown on the weights
5.5 inches	5500 lb
5 inches	5000 lb
4.5 inches	4500 lb
4 inches	4000 lb