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FAO/ECA/FOREST INDUSTRIES  
ADVISORY GROUP FOR AFRICA (FIAG)

TF/RAF/82/001/11-01

ZAMBIA

Technical Report: Timber for Construction\*

Prepared for the Government of Zambia  
by the United Nations Industrial Development Organization

Based on the work of Helge Günzerodt, Associate Expert

Backstopping Officer: R.M. Hallett, Agro-based Industries Branch

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## **PURPOSE**

Follow-up visit to complement information received during the previous mission in March 1986 in order to update data available on timber utilization from Zambian plantations.

Further to an earlier mission report about the present stage of timber utilization from fast growing local plantations (FIAG/86/18), it was found necessary to collect additional information to substantiate the argument presented.

## **BACKGROUND**

As part of FIAG's involvement in the promotion of the wider and better utilization of fast-growing timber species from industrial plantations, the group supports initiatives taken in African countries to achieve this goal. Zambia has over the past decades established a considerable plantation area (some 40.000 ha) and is producing about 25.000 m<sup>3</sup> of sawn timber per annum from these forests. The Zambian domestic consumption of sawn timber however is estimated at around 100.000 m<sup>3</sup> per annum, of which the greater portion, about 45% is originating from indigenous, non renewable resources, while the remaining 30% represent imports mainly of upgraded softwood species equivalent to those growing in Zambia. Tests made to compare the mechanical and technological properties of locally grown with those of imported pines (*Pinus kesiya*) revealed only insignificant differences (1). In addition an initiative was launched from the Forest Products Division, the Zambian Standards Institute, the Industrial Plantations Department and other members of the timber industry to elaborate "a code for the structural use of timber in building". The final draft of these standards has now been produced and will be printed in due course.

## **ACTIVITIES AND DEVELOPMENT**

The main responsibility for the establishment, maintenance, harvesting and marketing of timber plantations lays in the hands of the Zambia Forestry and Forest Industries Corporation Ltd., (ZAFFICO). According to its annual report 1986 and "in line with the Corporation's present policy to lay greater emphasis on the commercial exploitation of resources, the logging and sawmilling activities were stepped up

during the year under review" (2). Some 25.000 m<sup>3</sup> of sawn timber were produced in 1985/86 compared with 21.500 m<sup>3</sup> in 1984/1985. Production of specially treated transmission poles increased from 6.524 in 1984/85 to 12.194. ZAFFICO intends to continue increasing its output, planning greater capacity sawmills to replace existing ones (Kafubu). Improvement of timber quality is also anticipated due to recently installed kiln driers (Kafubu).

As part of the Industrial Forest Project Phase III initiated last year and with the assistance of the International Development Association (IDA) and the Finnish International Development Agency (FINNIDA), ZAFFICO is at present executing a large scale rehabilitation program. Its overall target is the gradual reduction of timber imports until 1990 and the production of 70.000 m<sup>3</sup>/a to become selfsufficient in the consumption of softwoods.

In parallel to the expansion program ZAFFICO is focusing on the better acceptability of Zambian sawn timber on the local market which at present still favours imported pine (see mission report FIAG/86/18). To a minor degree problems have been encountered with the introduction of CCA-treated poles, whereby the customer was not and could not be convinced of an equally reliable product as the conventionally used creosote-treated pole. ZAFFICO has therefore introduced a double treatment, starting with a conventional vacuum-pressure process with CCA and applying a final dip-treatment with creosote "to make the pole look black". A second reason for the additional creosote-dipping is related to the improved redrying performance of poles: double treated poles show less checking.

CCA-treated sawn timber for construction purposes on the other hand is only available upon request. There is at present no independent body such as a national timber preservation authority, supervising and monitoring the general practiced timber preservative treatment in Zambia.

Grading of sawn timber from plantations is limited to three categories: 1) Crates and box timber ; 2) Building material and 3) Joinery and furniture. In addition timber is classified according to size (length and cross section). Upon implementation of the recently approved "Zambia Standard Code of Practice for Structural Use of Locally Grown Timber", a more sophisticated grading system will be applied. However the introduction of the code will be dependent on the follow-up action of the "Technical Drafting Committee", (Annex III), which elaborated and drafted the code.

#### **COMMENTS AND RECOMMENDATIONS**

There is little doubt about the potential of Zambia to not only become selfsufficient in its consumption of timber but to eventually produce a surplus for export purposes. The situation of the raw material is hence satisfactory, while support is necessary in the following:

1. Expansion of air seasoning facilities
2. Increase of the kiln drying capacity
3. Improvement and expansion of antisapstain facilities
4. Improvement in the marketing of locally grown timber
5. Implementation of the "Zambia Standard Code of Practice for Structural Use of Locally Grown Timber".

Attempts taken in the direction such as the introduction of kiln driers, preservative plants and antisapstain dipping facilities by ZAFFICO, as well as the combined effort to elaborate and apply standards for timber in construction shall be continued. This aspect was stressed during the meeting with the officials of the Zambia Bureau of Standards (ZBS) and the author. It was agreed to call a meeting of the participants who had contributed to the elaboration of the standards with the purpose to coordinate future activities. It was also felt that on a longterm basis a permanent and independent local body or an association should be formed to represent the interest of all members of the forests and forest industries sector. First initiatives in this direction will probably be taken by the ZBS in the next months and it is hoped that UNIDO and and FAO Headquarters will be kept informed.

A further aspect was raised during the mission concerning the possibility of charcoal production from thinnings extracted from ZAFFICO plantations on the Copperbelt. At present recoveries from thinning operations from up to 14 year old plantations are left in the forest mainly due to "an abundancy of raw material". At the same time in the immediate vicinity of the plantations native trees are being logged with the sole purpose of charcoal production. It appears that efforts to produce and sell charcoal from thinning recoveries have had little success due to problems of acceptability. According to the Logging and Processing Manager of ZAFFICO, outside assistance would be welcomed to supply expertise in the field of charcoal technology (upgrading, densification: see Annex IV).

#### **References**

- (1) "Comparison of the number and size of knots in local exotic Pinus kesiya versus imported Swazi pine sawn timber"

M.O. Laakkonen, Division of Forest Products Research, Special Report March 1986, Kitwe.

- (2) "Annual Report and Accounts"

Zambia Forestry and Forest Industries Corporation Limited,  
Financial Summary, 1986

**TRAVEL ITINERARY**

FIAG Mission: H. Günzerodt

- Monday, 13 October - Flight NAIROBI - LUSAKA
- Tuesday, 14 October - Visit of UNDP Office  
Administrative arrangements and establishment  
of contacts
- Wednesday, 15 October - Travel to Kitwe and visit of the Forest Products  
Research Division. Discussion with local timber  
engineer about the draft structural code
- Thursday 16 October Visit of ZAFFICO headquarters and meeting with  
the Managing Director. Visit of the Kalibu  
sawmill and discussion of future developments with  
the Deputy Logging and Processing Manager
- Friday 17 October - Close up meeting with the Logging and Processing  
Manager of ZAFFICO  
- Travel to Lusaka
- Saturday 18 October - Review of documents collected from ZAFFICO  
including the draft structural code
- Sunday 19 October - Visit of suburbs of Lusaka
- Monday 20 October - Visit of the Zambia Bureau of Standards and  
meeting with the Director to discuss possibilities  
to apply the draft structural code  
Close-up visit to UNDP
- Tuesday 21 October - Flight LUSAKA - DAR-ES-SALAAM



**PERSONS MET DURING THE MISSION**

**LUSAKA**

Mr. Carvalho, Programme Officer UNDP  
Mr. E. Mustala, Programme Officer, UNDP  
Mr. G. Bekele, UNIDO SIDFA, UNDP  
MR. S. Mwambazi, Director of the Zambia Bureau of Standards  
Mr. G. Whiston, Consultant Overseas Development Unit,  
British Standards Institution

**KITWE**

Mr. Laakkonen, Timber Engineer - FINNIDA at Forest  
Products Research Division  
Mr. H. Kaijoomaa, Wood Industries Development Officer  
Forest Products Research Division

**NDOLA**

Mr. F. Nduna, Managing, Director, ZAFFICO  
Mr. P. Chitondo, Senior Plantations Officer, ZAFFICO  
Mr. C. Shikaputo, Deputy Logging and Processing Manager,  
ZAFFICO, Kalibu Sawmill  
Mr. Banda, Sawmill Superintendent, ZAFFICO,  
Kalibu, Sawmill  
Mr. K.G. Nilsson, Logging and Processing Manager, ZAFFICO

Zambian Standards Institute  
P.O. Box 50259  
LUSAKA

Our Ref: TDC/4/3

MINUTES OF THE FIRST MEETING OF THE TECHNICAL DRAFTING COMMITTEE ON THE  
STRUCTURAL USE OF TIMBER IN BUILDINGS HELD ON TUESDAY, 23 FEBRUARY 1982  
AT 10.00 HOURS IN THE CONFERENCE ROOM OF THE ZAMBIA STANDARDS INSTITUTE

**PRESENT**

1. Mr. C. Shikaputo	Forest Products Division	Chairman
2. Mr. N.S. Bwalya	Kitwe District Council	Member
3. Mr. M.A.V.G. Fernando	RCM Ltd, CED	Member
4. Mr. M. Laakkonen	Forest Products Division	Member
5. Mr. M. Mukelabai	Zambia Standards Institute	Member
6. Mr. J.E. Mutesasira	Buildings Dept. Min. of Works and Supply	Member
7. Mr. J.F. Mwale	Ndola Urban District Council	Member
8. Mr. V.P. Narang	Lusaka Urban District Council	Member
9. Mr. R. Neeko	John Burrow and Partners Ltd	Member
10. Mr. F.B. Ndula	Industrial PLantations Department	Member
11. Mr. E.N. Peele	Zambia Steel and Building Supplies Ltd	Member
12. Mr. D.J. Mesa	Zambia Standards Institute	Secretary

**APOLOGIES**

1. Dr. P.R. Mukherjee	School of Engineering, UNZA	Member
2. Mr. J.R. Oliver	NCCM Ltd Head Office	Member

**ABSENT**

1. Dr. C. Mdala	School of Mines, UNZA	Member
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**ZAMBIA FORESTRY AND FOREST INDUSTRIES  
CORPORATION LIMITED**

**LOGGING AND PROCESSING DEPARTMENT**

**PROJECT PROPOSAL: Charcoal**

Zaffico's major part of forest utilization is dominated by sawmilling only, because of this operation, wastage in processing of round logs into sawn timber results in enormous waste both in the plantations and at the sawmill sites.

It is estimated that in terms of actual wood harvested only about 57% is actually transported while 43% (67,397 m<sup>3</sup> for 1985/86 figure) is left in the plantation as waste. Furthermore, because the major part of forest industries is dominated by sawmilling activities, there is an inherent wastage in sawing of round logs into sawn timber as recovery percentage average about 42%. Therefore there is about 58% or 36,500 m<sup>3</sup> as waste in the form of slabs, offcuts, sawdust and bark. (1985/86 figures). This wastage from the plantations and sawmill represents 2.4 million Kwacha in monetary terms using current average prices charged by ZAFFICO for this type of material:

**TABLE A: Wastage from plantations and sawmill sites expressed in  
monetary terms per annum**

<u>Material</u>	<u>Vol m<sup>3</sup></u>	<u>K/m<sup>3</sup>(*)</u>	<u>Total</u>
Small wood and branches left in plantations (firewood)	67,400	25.00	1,685,000.00
Slabs offcuts, the mills (firewood)	36,500	20.00	<u>730,000.00</u>
			<u>2,415,000.00</u>

There is therefore a wastage of the magnitude of K 2.4 million arising from lack of further processing for smallwood and offcuts.

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(\*) Exchange rate US\$1.00 = 8.00 K (Kwacha) per 1/10/86

It is therefore proposed that ZAFFICO considers taking up charcoaling in order to utilize the waste from the plantations and from the sawmill sites. The Project will be in two sections. One based on plantation waste and the other on mill site residues (slabs-edges-offcuts etc.)

A. PLANTATION BASED PROJECT

For the plantation based project it is proposed that portable steel kilns be used, since they can be moved from one area to another.

Project Costs

10 portable steel kilns	Available
1 Chain saw and bow saws	K 5,000.00
Transport, fuels and oils	K 5,000.00
Wages for 4 kiln operators and one supervisor	K 12,120.00
Miscellaneous e.g. packing material	<u>K 4,000.00</u>
<b>Total cost</b>	<u>K 26,120.00</u>

Expected yield based on 10 kilns

Total Capacity	70 m <sup>3</sup>
* Charcoal yield/charge	17,5 tonnes
Total No. of charges per/year	<u>54</u>
Total output of charcoal	<u>945 tonnes/annum</u>

**NOTE** \* Wood to charcoal conversion efficiency is 25% in portable steel kilns.

B. MILL SITE BASED PROJECT

For the sawmill site based project, it is proposed that a masonry kiln should be built.

Project Cost: Based on 1 masonry kiln with 15 m<sup>3</sup> capacity

Construction of 1 masonry kiln	K 1,500.00
1 Chainsaw and bow saw	K 5,000.00
Fuels and oils	K 1,000.00
Wages for 2 kiln operators and one supervisor	K 7,440.00
Miscellaneous e.g. bags	<u>K 3,000.00</u>
	K 17,940.00

Expected yield based on 15 m<sup>3</sup> masonry kiln

Total capacity	15 m <sup>3</sup>
* Charcoal yield	4 tonnes
Total No. of charges/year	43
Total output of charcoal	<u>172 tonnes/annum</u>

**NOTE**

\* Wood to charcoal conversion efficiency is 28% in masonry kilns

The most feasible way therefore of utilizing the 102,900 m<sup>3</sup> of small wood and offcuts, etc, that has no market is to set up these kilns. This is the only processing facility that will substantially reduce the wastage of the plantation forest resources.

C. Shikaputo  
DEPUTY LOGGING AND PROCESSING MANAGER

CS: rbc.