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MACHINERY AND EQUIPMENT FOR THE  
NATIONAL TANNING FACTORY, SHEIKH OTHMAN, ADEN,  
PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN

UD/PDY/79/140

PDR Yemen,

Technical Report: Evaluation of Techno-economic Study  
on Viability of Processing of Wool Sheepskins \*

Prepared for the Government of the  
People's Democratic Republic of Yemen  
by the United Nations Industrial Development Organization

Based on the work of Tomislav Vuković,  
Consultant in Processing of Wool Sheepskins

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1. EXPLANATORY NOTES

The monetary unit in the People's Democratic Republic of Yemen is the Dinar (YD) and there are one thousand fills to one dinar. During the period covered by this report, the value of the dinar in relation to the \$US was YD 0.341 = \$US 1.00.

## 2. ABSTRACT

*As a consultant in processing of wool sheepskins in UNIDO project UD/PDY/79/140/11-51/31.7.D from 1 to 10 December 1985, I have investigated the viability of setting up a plant for the processing of locally available wool sheepskins within The National Tanning Factory Sheikh Othman, Aden, PD Yemen. During the period of ten days with the representatives of the Ministry of Industry and the National Tanning Factory Sheikh Othman I have discussed the Techno-economic Study on the Viability of Processing sheepskins in PD Yemen prepared by Tehnološki oentar, Karlovac, Yugoslavia.*

*This "Study" was prepared in October 1984/January 1985 and the final version was submitted to the Government of the People's Democratic Republic of Yemen in June 1985.*

## 3. INTRODUCTION

*The People's Democratic Republic of Yemen has imported annually -for the past seven years - 120.000-150.000 Australian live sheep in order to supplement the country's meat requirements. The imports for the current year are expected to be comparable with those of the previous years and will foreseeably, in line with the Government policy, continue in future. Most of the imported sheep are slaughtered in the municipal abattoirs of the First Governorate (Aden) and the skins delivered to the National Tanning Factory for the further treatment.*

However, the existing facilities at the National Tanning Factory to preserve or process these skins are inadequate, therefore, the valuable raw material, due to the prevailing climatic conditions, is rendered virtually valueless already after a relatively short time of being stored. Owing to the type of wool and skin structure, wool sheepskins are suitable for producing seat covers for cars, popular in many western countries.

In "The Study" prepared by Tehnološki centar, Karlovac, Yugoslavia the technology of wool sheepskins to furs was elaborated. According to the technological process a list of machinery and equipment was prepared. The layout with drawing for factory building, consumption of chemicals, water and energy was given. Necessary manpower has been prepared. Finally "The Study" gives the price of investment costs, production and total sales. From the technological viewpoint two important problems were resolved. (1) The use of saline water in fur processing because of water shortage could be of technological and economic advantage.

(2) Processing of fresh sheepskins directly from abattoirs will overcome the deterioration of the sheepskins caused by inadequate curing.

The Ministry of Industry PDY and the National Tanning Factory Sheikh Othman, Aden received "The Study" in June 1985 and have studied all the details during the period before my coming to Aden.

#### 4. ACTIVITIES

##### 4.1. UNDP in the People's Democratic Republic of Yemen, Aden

Mr. Ismail Mohamed, the programme officer dealing with programme and project matter has made necessary plans for my mission in Aden.

After discussion in the Ministry of Industry and the National Tanning Factory he has organized an appointment with the Deputy President Representative Mr. Taoufik Ben Amora to whom I gave all information about "The Study" and my investigation.

##### 4.2. Ministry of Industry

With Mr. Ikbal Yasin, assistant of the Deputy Minister in the presence of Mr. Mansoor A. Mansoor, the General Manager of the National Tanning Factory I have discussed all the aspects of implementation problems. First of all Mr. Ikbal Yasin informed me about the decision of the Government to present "The Study" at Solidarity Meeting which will be held soon in Aden. The purpose of this "Meeting" will be to get financial and other supports of the invited countries in the development of national economy. I have suggested also other implementation possibilities for wool sheep processing capacity.

- loans from machinery and equipment suppliers.

- joint venture and cooperation with an European enterprise

In further discussion they have expressed their concern before a final decision as follows:

- Amount of investment with the other costs not elaborated in "The Study" will be more than 800.000 US Dollars.
- The National Meat, Hide & Skins Corporation will continue importing live sheeps from Australia, but at the moment they are not sure about quantity
- New Technology without technologists will not give results presented in "The Study". Even in the tannery which has been running for many years there are many problems in processing of leather.

Finally I have suggested implementations of about 50% of the total capacity, and as a first step to process the wool sheepskins prepared for dyeing and export them to the buyers. Mr Ikbal Yasin has accepted my suggestions and asked me to elaborate details with the representatives of the National Tanning Factory.

#### 4.3. National Tanning Factory Sheikh Othman, Aden

The Tannery process at present locally available hides to shoe upper leather as grain leather and hunting suede.

The raw goat skins of good quality are processed as "pickled" and finished leather. Factory exports pickled goat skins to Europe. The Tannery is supplying the Leather shoe factory in Aden with various types of finished leather.

*With general manager Mr. Mansour Ahmed Mansour and his technical staff, I have continued discussion, I had in the Ministry of Industry. There are some additional problems in connection with the implementation of the new plant for wool sheepskins processing.*

- Big quantity of sheepskins stored outside the factory is almost valueless, but still remains the wool which could be taken off.*
- Local goat skins of good quality as explained, in pickled conditions, are exported and factory intends to increase the production.*
- As in the Ministry of Industry, also the Tannery staff prefers to start with a lower capacity in the new production of furs, for the same reason expressed by Mr. Iqbal Yasin from the Ministry of Industry.*
- In the National Tanning factory some of the buildings between the store and the lining department at the moment are not used. With the small reconstruction in which the roof should be a little bit lifted up and with the removal of two walls it would be possible to get space for soaking, washing, pickling and tanning.*



## 5. SUGGESTIONS

*The capacity for processing approx. 200 pieces wool sheepskins per day, to be installed (as step number one).*

*According to "The Study on the viability of processing sheepskins", for the capacity of oca 200 pieces wool sheepskins per day following equipment is required:*

- 3 paddles capacity of 10.000 l each*
- hair and wool washing machine*
- fleshing machine*
- wet fur shearing machine*
- centrifuge*

*To process above quantity of wool sheepskins for dyeing, process of neutralisation, fatliquoring and drying, additional equipment and space are necessary.*

*Following the opinion of the Ministry of Industry and the National Tanning factory, suggested capacity could be installed as completely new factory with new machines, equipment and building, all at lower costs than capacity given in "The Study".*

*There is also a less expensive solution in using the present building and combination of new equipment with the already installed machines, whose capacity is not completely employed in leather processing.*

5.1. *New machines*

*The necessary machines for processing of 200 pieces wool sheepskins per day in wet department are as follows:*

a) *Paddles for soaking, washing, pickling and tanning - "Kostroj" M<sub>14</sub>*

<i>Capacity :</i>	<i>l</i>	<i>10.000</i>
<i>Installed power :</i>	<i>KW</i>	<i>5,5</i>
<i>Floor space required: mmxmm</i>	<i>4.644</i>	<i>x 3.030</i>
<i>Number of paddles :</i>		<i>2</i>
<i>Workers :</i>		<i>5</i>

b) *Hair and wool washing machine "Divota" type - 20*

<i>Working width :</i>	<i>mm</i>	<i>1.250</i>
<i>Capacity :</i>	<i>skins/h</i>	<i>50</i>
<i>Installed power :</i>	<i>KW 2+3 =</i>	<i>5</i>
<i>Floor space required: mmxmm</i>	<i>3600</i>	<i>x 1500</i>
<i>Number of machines :</i>		<i>1</i>
<i>Workers :</i>		<i>1</i>

c) *Hydraulic fleshing machine*

"Solčava B" type A-22

Working width :	mm	1250
Capacity :	skins/h	100
Installed power :	KW	7,5
Floor space required:	mmxmm	2650 x 110
Number of machines :		1
Workers :		2

d) *Wet fur shearing machine*

"Jezarka" type Y10

Working width :	mm	1500
Capacity:	skins/h	100
Installed power :	KW	10
Floor space required:	mmxmm	3000 x 2485
Number of machines :		1
Workers :		2

e) *Centrifuge*

"jedinstvo" - Zagreb

Ø	mm	1100
Capacity :	skins/h	300
Installed power :	KW	5,5
Floor space required :	mmxmm	2000 x 200
Number of machines :		1
Workers :		1

Provided the mentioned reconstruction is carried out it would be possible to install the machines under a, b, c, and e in the building now not used in the factory. The machine under d better be installed somewhere outside of that building but not far away.

### 5.2. The building

In annex I. the layout with necessary new machines is given. The walls for removing are marked.

### 5.3. Process after tanning

Neutralisation and fatliquoring is possible to carry out in the first soaking paddle, because of very short soaking of fresh skins.

#### - Drying

Air drying of skins according to the climate conditions in Aden will be in fur technology a good solution.

#### - Mechanical operations

Buffing and staking, if necessary, could be done in finishing department.

#### - Toggling

The unit in leather finishing department could be used in second shift for toggling of furs.

As the newly built finishing department is now used only 50% for leather processing, all necessary work as buffing, staking, toggling, and sorting could be done easily in finishing department. Naturally a mixed leather and fur processing has certain problems, but as the first step in the processing of wool cheepkins the given solution could be reached with relatively low costs.

5.4. The costs of suggested solution

5.4.1. The costs of machines (as given in "The Study" )

Name of machine/equipment	N. of pieces	Price per unit US \$	Total price US \$
1. Paddles M <sub>14</sub>	3	12.350	37.050
2. "Divota"	1	10.895	10.895
3. "Solčava"	1	14.312	14.312
4. "Jezerka"	1	12.463	12.463
5. Centrifuge	1	22.000	22.000
<b>TOTAL COSTS :</b>			<b>96.720</b>

5.4.2. Transport of machines and installation approx. 40.000 \$

5.4.3. Reconstruction of the building and all installation for water and energy consumption should be made by the National Tanning Factory.

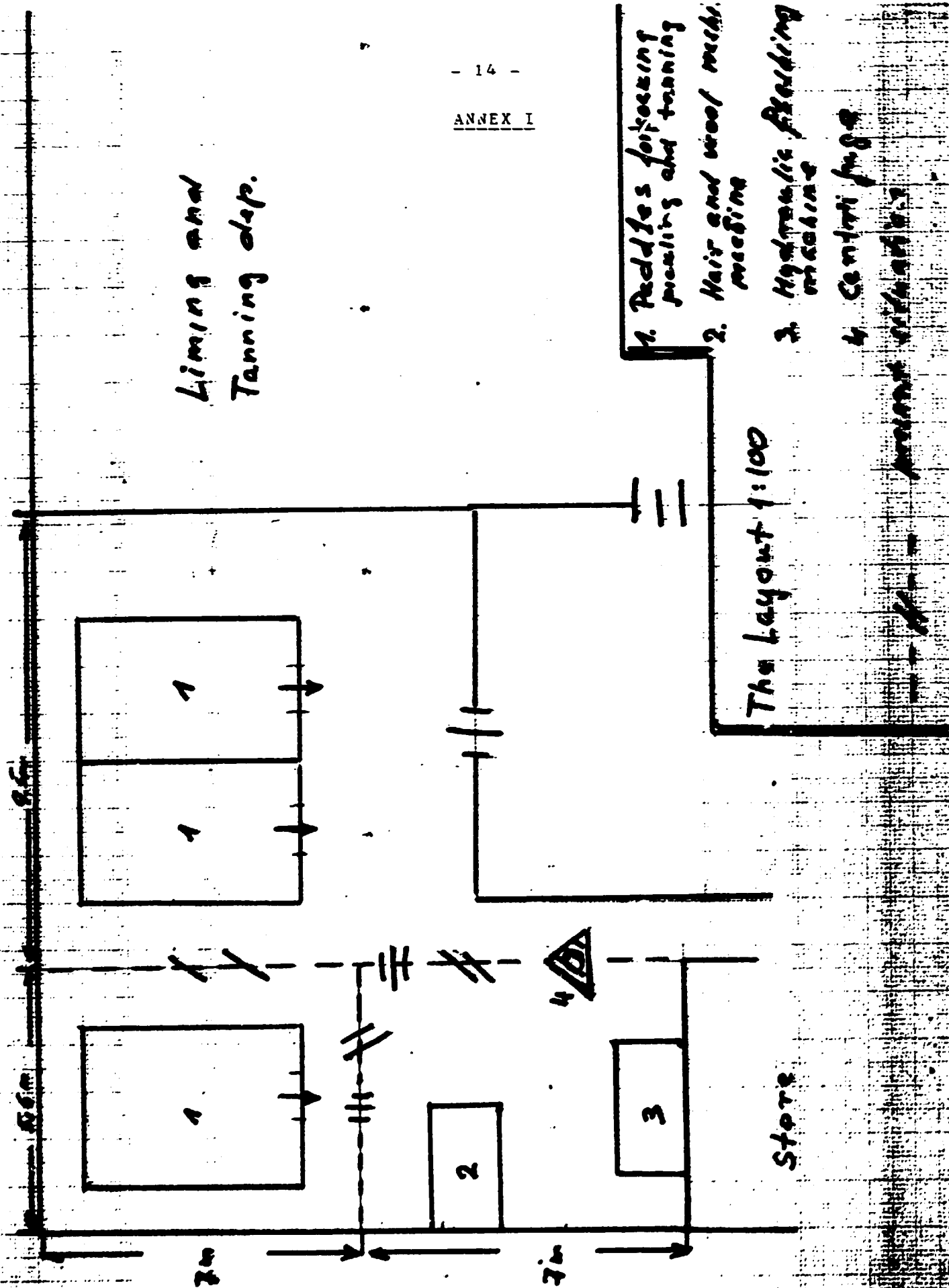
5.4.4. *Training of technicians is necessary to be organized in advance and arranged through scholarships for machinery suppliers.*

*All the prices given in paragraphs 5.4.1. and 5.4.2. are given on the basis of "The Study" . The costs of reconstruction, energy and water installation, as well as training of the technologists should be examined according to the new situation which can be carried out by tannery staff.*

#### **6. Conclusions**

*The investment costs for capacity of processing 200 pieces wool sheepskins per day , as explained in previous paragraphs is very low in comparison with the cost given in the study. Such solution will in future assure a better productivity in the National Tanning Factory because the equipment for processing of wool sheepskins could be used for increasing the production of pickled goat skins for export also. Naturally the same equipment should be used at first for the processing and dewooling of stored d maged wool sheepskins.*

ANNEX I



Liming and Tanning dep.

- 1. Paddles for processing
- 2. Hair and wool mangle
- 3. Hydraulic flanking machine
- 4. Centrifuge

The layout 1:100

Store