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ENGLISH

ASSISTANCE IN LEATHER GRADING AND QUALITY CONTROL

SI/BUR/84/802

BURMA

Technical report: Improvement of the leather quality
for export and the local market*

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

Based on the work of Max Georg ecker,
Expert in Production of Lea r

United Nations Industrial Development Organization

Vienna

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EXPLANATORY NOTES

The following abbreviations have been used in the report:

GIC General Industry Corporation
RIT Rangoon Institute of Technology
CRO Central Research Organization
LGF(R) Leather Goods Factory, Rangoon
LF(R)1 Leather Factory Rangoon No. 1
LF(R)2 Leather Factory Rangoon No. 2
LF(M) Leather Factory Mandalay
PFF(I) Peoples Footwear Factory, Indaing

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ABSTRACT

The LF(R)1 is one of the most modern Leather Factories with an annual production capacity of approximately 102.000 light-medium and heavy hides for shoe upper leathers and 150.000 skins for various types of leather.

The LF(M) is still under construction/renovation and the start of production is expected approximately in the middle of 1985. The production capacity has been planned per annum for approximately

96.000	light-medium hides for shoe upper leather
24.000	heavy hides for sole leather
120.000	skins for various kinds of leather

Approximately 45% of the cow hide production for shoe upper leather has been exported as "wet blue" and only a small quantity in "crust" condition.

Approximately 55% has been produced for the local market, mainly to "Zug Grain", a black finished and embossed, army type of leather for the PFF(I) and LGF(R).

All the splits are being used by the LGF(R) for the production of Industry Gloves.

The export of skins is limited on account of the low quality of the raw material.

The chrome tanned goat and sheepskins are produced up to "wet blue" condition and further to boxing gloves, shoe uppers, hand bags, valets and lining leather, mainly for LGF(R).

The leather quality for the export and local market is below standard and not according to international specifications and standards.

Quality improvement of the leather is required to:

1. earn more foreign exchange by higher value added exports
2. more and improved productivity and quality
3. guarantee to fulfill export commitments with standardised products
4. better reputation and name in the international market
5. good marketing image.

In future, overseas importers should be able to receive a standard and specified leather quality in "wet blue", crust and finished condition from Burma for which they are able to offer international prices.

For the production of a good leather quality for the local and export market it is essential to improve as follows:

1. Preservation of raw hides and skins
2. Selection at various stages for the suitable purpose
3. Standardised process from soaking to finishing for various kind of leather
4. Process control
5. Product quality control. Physical and Analytical Tests to follow international standards and specifications
6. Proper stock keeping for chemicals and machine spare parts to avoid loss of production
7. The new technology should be valid for LF(R) 1 and LF(M) to enable fulfillment of export orders commitments, producing the same leather quality with the same chemicals.
8. Local training of foreman, operators and labourers for better performance and efficiency
9. Follow up of the recommendations

The leather quality can be improved by the Tannery, provided adequate measures are taken, as indicated.

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Remarks: During this mission, short reports have been made daily to pinpoint down findings and recommendations on the spot. These reports are informations to GIC, Factory and Technical Production Manager for immediate action and implementation.

INTRODUCTION

The Government of the Socialist Republic of the Union of Burma requested assistance from the United Nations Industrial Development Organization (UNIDO) for the project SI/BUR/84/802/11-01/31.7 D, asking for an Adviser on the production of Leather, Priority Assistance in Leather Grading and Quality Control.

The United Nations Industrial Development Organization (UNIDO) was the Executing Agency and the General Industry Corporation (GIC), Ministry of No. 1 Industry was the counterpart.

A Leather Specialist with long time experience in Leather Production and Marketing was sent to Burma on a four-month mission from 11 November 1984 till 10 March 1985.

The experts duties were to improve the Leather quality, prepare a Manual/Instructions booklet on the Sorting and Grading of hides and skins in various process stages like "wet blue", crust and finished leather according to methods and standards in the international Leather Trade.

To prepare a list of main chemicals parameters to be regularly checked.

To instruct and train Sorters and Graders to the generally recognized system and standards.

To prepare suitable forms to accompany every delivery.

To prepare a final report, setting out the findings and recommendations to the Government on further steps to be taken.

The most modern LF(R) 1 had been planned well on the building and equipment side but without much knowledge of Leather Technology. The result is a leather of low standard that lacks process and quality control.

The expert's recommendations are contained in the body of the report.

I wish to thank all the persons assigned to me for the good team work and the General Industry Corporation and LF(R) 1 for the kind assistance rendered to make this mission a full success.

REPORTING STAGES FOR FINDINGS AND RECOMMENDATIONS

1. Slaughter house flaying and preservation of hides and skins
2. Raw hides and skins, sizing, preparation for soaking
3. Process from soaking till wet blue condition/selection ex-lime/process details
4. Storing of wet blue hides/skins, packing for export
5. Process control, establishing of process control book
6. Process from sammying to crust condition
7. Process from crust to finishing
8. Product quality control, Physical and Analytical tests in the laboratory, international standards for hides and skins, establishing of product quality control data book
9. Selection at various stages of the process
10. Yield calculation - establishing lot cards
11. Marketing, price list, leather samples collection, order situation
12. Effluent
13. Maintenance
14. Transport inside the Factory
15. A) Up to date technology for quality improvement
B) Old technology
16. Training programme for 4 Day seminar
17. Visits to 7 other Factories
 - 17.1. Slaughter house Rangoon
 - 17.2. Rangoon Leather Factory No. 2
 - 17.3. Leather Goods Factory Rangoon
 - 17.4. Rangoon Institute of Technology
 - 17.5. People's Footwear Factory at Indaing
 - 17.6. Leather Factory Mandalay
 - 17.7. Central Research Organization

18. Production of self reduced chrome liquors, 3 Stocksolutions from Sodiumbichromate 6+ to chrome liquors 3+ .
19. Experiments/Trials, process details for old and new wet blue stocks for various types of leather
20. Chemical stock keeping- future planning
21. Trimming at various stages of the process
22. Production capacity, with immediate quality improvement
23. Future planning, factory layout plan- flow chart
24. Final remarks - follow up etc.

1. FINDINGSReporting Item 1

The slaughter house in Rangoon has been visited in November 1984. Every day at 10:30 a.m. killing and flaying is started. Hides and skins are immediately available. The flaying is fairly good without any holes. There may be some deep cuts only. The Lorry from the LF(R)1 is waiting nearby to collect the daily supply of Rawmaterials. Without preservation, Raw-hides and skins are piled in a stack on the Lorry for 4-5 hours until arriving at the LF(R)1 at approximately 2 p.m. Only then the salt-preservation starts. All this takes place at the local climate of 30-40°C and the humidity may be 40 - 96%. Finally all the Raw hides and skins are well preserved at 15:30 p.m. with excess but proper ground salt. After resalting the 2nd or 3rd day piling starts again in stacks up to 1.6 m high, spread out and piled flesh side to hair side.

In this condition the stacks may be kept for 1-6 month until there is demand from the Tannery or they are selected and packed in bundles for Export. The treatment for skins is similar. As soon as a sufficient quantity is available they go for soaking into the tannery or are prepared to "dry salted" condition, toggled in the sun for drying and packed for export. The buildings for storing the raw hides and skins are too hot and not suitable.

Raw hides and skins which arrive from the country side are insufficiently preserved and many arrive at the Tannery in a smelling- hairslip condition. Many of these hides/skins show heavy grain damages and are rejects already from the beginning. In addition, the flaying is done very badly. There are too many holes and deep butcher cuts.

At present there are 141 co-operative and private collecting places for raw hides and skins established all over the country. Not sufficient salt is available at these places for immediate and effective preservation.

Reporting Item 2

There is no proper sizing of hides into light-medium-heavy weight ranges which is required for preparing the soaking lots.

light hides	7-11 kg.	approx	1000	pieces	for	1	lot	of	9	tons
medium hides	12-15 kg.	"	666	"	"	"	"	"	"	"
heavy hides	16 kg up,	"	562	"	"	"	"	"	"	"

Soaking lots of 3 and 7.5 tons are also prepared for different drums. Heavy buffalo hides are not suitable for this factory.

Skins are small in quantity. As soon as 2000 - 2500 goat and sheepskins are collected, approximately 3 ton soaking lots are prepared. Goat and sheepskins are mixed up in the soaking lots. The required Chemicals for the Soaking process are calculated on the raw hide/skin weight.

The weight of hides and skins is taken on a Kg. scale
The weight for the Chemicals on a Lbs. scale

Reporting Item 3

A. Soaking process

After the usual dirty soaking operation and water change, small quantities of sodium sulphide, bactericide and wetting/soaking agents are being added. The soaking time is only over night, which is sufficient for wet salted hides but insufficient for hides which are more dry.

B. Liming process

All hides are greenfleshed on the special fleshing machine at the end of the soaking process. This operation is insufficient as too much flesh/meat (heavy layers) remain still on the hides. Also the trimming is improperly done.

After greenfleshing the soaking weight is taken for the calculation of all the chemicals for the following operations:

Liming, reliming, deliming, bating,
pickling and chrometanning.

Also here the weight for the hides is taken on a Kg. scale, the weight for the chemicals on a Lbs. scale.

Hides are taken back into the drums for washing. Thereafter the liming chemicals are added in 2 installments at intervals. Usually the grain side is not free of the hair and additional quantities of sodium sulphide and lime powder are being added.

The liming time of 16 and the reliming time of 8 hours is sufficient. The temperature of the liming liquor, the normal cold water available is showing 28 - 30°C or even higher temperature.

There is less mechanical action in this most modern 3 chamber drum compared to the normal drums. The speed of the drums is not properly set. The high speed is being used too often. Only local sodium sulphide (25° Bè liquid) and lime powder is available. Both chemicals are not of good quality.

There is no selection ex lime. All the hides remain in the drum for further processing.

The skins are treated somewhat differently from the hides. After soaking, skins remain in the drum for the liming process and are fleshed after 24 hours of liming/reliming time followed by scudding on the machine. There is no ex-lime selection. Goat and sheepskins are not separated. No containers or equipment is available for reliming the skins for soft leather items.

The fleshing machine for ex-lime fleshing has been installed next to the ex-chrome splitting machine for hides without any separation.

C. Deliming till Pickle process

For hides, excess chemicals have been used in the deliming, bating and pickling process. Also the time is too long to reach the full deliming. The cut of the pelt is checked with the indicator phenolphthalein.

Chemicals are calculated on the green fleshed weight, but should be calculated on the pelt weight.

Weight tests have been carried out showing the following differences:

	C O W H I D E S		
Weight range:	light	medium	heavy
Green fleshed soaking weight	8000 kg	7800 kg	3300 kg
Pelt weight	11000 kg	9900 kg	4500 kg
Weight increase	3000 kg	2100 kg	1200 kg
Percentage	37.5%	26.9%	36.4%

The technicians of this factory have been trained in India where they were informed that the raw hide weight is similar to the pelt weight. This may be correct in India, where the raw hides are usually very wet. The green fleshed soaking weight is also approximately 11% lower than the raw hide weight in Burma. The calculation on the greenfleshed weight is completely wrong and caused the biggest problem in this factory. The chemicals must be calculated on the only accurate weight, the pelt weight.

Here also, the soaking weight has been taken in Kg., the chemicals have been taken on the lbs. scale.

The pickle pH has been much too low as excess Sulphuric acid has been used.

For skins the chemicals for the deliming, bating and pickle process have been calculated properly on the peltweight. The pickle pH has been normal.

D. Chrometanning process

For hides, instead of calculating 2% Cr_2O_3 on the pelt weight, 2% Cr_2O_3 has been calculated on the approximately 27 - 37.5% lower green fleshed soaking weight. To result a full penetration of the chrome especially for heavy hides with a substance up to 12 mm is very difficult if less chrome is calculated and offered. For this reason, too big quantities of sulphuric acid have been used to reach a full chrome penetration at a very low pH. Many times the chrometanning process has been extended up to 5-8 days just for chrome penetration until discharging from the drums.

The basification has been found insufficient. All the hides have been undertanned, the pH inside the "wet blue" hides has been very low which caused further problems in the following process operations.

Considering that the PFF(I) is vulcanising all the shoes at 140 to 180°C, but the leather tanned with much less chrome having a shrinkage temperature of only 80-90°C. The heat resistance of the leather is much too low and the result will be a low quality shoe with a very short wearing time.

For skins, the calculation of the chrome has been done correct. The basification, fixing the chrome on the end of the tannage has been insufficient. The wet blue skins showing a too low pH and the chrome content in the waste liquors is still too high.

Reporting Item 4

"Wet blue" full hides and skins have been stored very badly. Stacks and piles got dry from the top and around the edges. The grain side outside exposed to the light, drying out very hard. Also inside the stacks too many foldings have been pressed heavily by the weight of the hides. There has been no plastic foil available for covering and protection against drying out.

The packing of the "wet blue" stocks is done normally. Strong plastic bags covered with jute cloth are used. The packing is done as following:

EXPORT PACKING WEIGHT LIST

	<u>Pieces</u> <u>per 1 bag</u>	<u>weight</u> <u>lbs.</u>	<u>Average</u> <u>sqf.</u>
<u>A. "Wet blue" items</u>			
Ox / cow (heavy)	4	106	82.9
Buffalo	2	118	46
Goat / sheep	50	78	162.8
<u>B. "Crust"leather items</u>			
Ox / cow	10	50	269
Goat / sheep	100	60	432
<u>C. "Wet salted raw" items</u>			
Ox / cow	3	90	-
Buffalo	2	110	-
<u>D. "Dry salted raw" items</u>			
Goat	100	185	-

Report Item 5

The factory water checked in the Tanneries laboratory:
pH 7.3 temperature 30- 33°C (cold water)

For the official water analysis, dated 2.9.1980 details are shown on page 13 A-C.

There has been some process control, but completely insufficient, partly not correct and without adjustments.

1. pH control in soaking
2. pH control in liming
3. deliming control with phenolphthalein
4. pH control deliming/ bating
5. Bè control of pickle salt solution
6. pH in pickle
7. pH neutralizing float and cross cut with indicator bromcresolgreen
8. pH control: with pH paper and 1 pH meter on battery, glass electrode. The pH paper has been much discoloured by the high humidity. The glass electrode pH meter did not work correctly as no buffer solution for necessary adjustments has been available. Instead of pH 7 the pH meter is showing pH 6.2. Most of the above pH readings have not been correct and are misleading.
9. The speed of the drums is not properly controlled especially during the liming operation
10. There is no control of many operations as:
 - 10.1. Greenfleshing insufficient
 - 10.2. Sammying/setting before splitting "
 - 10.3. Splitting ex chrome, speed to fast and too much damage "
 - 10.4. Shaving -do- "
 - 10.5. Trimming -do- "
 - 10.6. Sammying/Setting before vacuum drying without heavy pressure no setting effect "
 - 10.7. Vacuum drying no proper setting and drying "
 - 10.8. No proper handling from sammying/setting machine to the vacuum dryer and from there to the hang drying "
 - 10.9. Conditioning time much to short before the waterspraying "
 - 10.10. Waterspraying with full wetting back results, to wet for the staking operation "

REPORT ON WATER ANALYSIS
2.9.1980

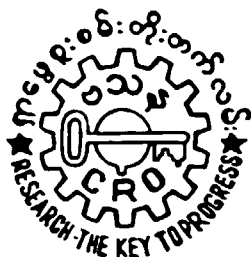
Source	Physical Character				Chemical Tests										
	Appearance	True Colour (Pt.Co. scale)	Smell	Sediment	Qualitative				Total solid	Chlorine (as Cl ₂)	Total hardness (as CaCO ₃)	Permanent hardness (as CaCO ₃)	Saline ammonia	Albuminoid ammonia	Iron (as Fe)
					Sulphate (as SO ₄)	Nitrates	Nitrites	Ignition							
6" tube well No. 1 (180') Leather Factory Rangoon	Clear	is Units'	Nil	Slight	5.9	0.70	0.02	charred	109.0	8.0	29.0	18.0	0.01	0.01	0.76
Manganese (as Mn)										= 0.14 ppm					
Copper (as Cu)										= Nil					
Zinc (as Zn)										= 1.0 ppm					
Oxygen absorbed from permanganate at 37°C for 3 hours										= nil					
Total alkalinity as CaCO ₃										= 37.0 ppm					
pH										= 6.9					

Remarks : Chemically potable

Certificate

Phone . 50544

Cable . CEREORG



THE SOCIALIST REPUBLIC OF THE UNION OF BURMA
CENTRAL RESEARCH ORGANIZATION

Yankin P.O.

R A N G O O N

Leather Factory (3) Insein, letter no.0755/431/80-81,
dated 25-8-80.

Reference:

Sample: Water (Artesian well).

RESULT

<u>Sample No.</u>		<u>802/80</u>
<u>Sample Marked.</u>		<u>No.(1) Artesian well water.</u>
Dissolved Solids	(p.p.m.)	106.00
Temporary Hardness as CaCO ₃	(")	14.00
Permanent Hardness as CaCO ₃	(")	20.00
Total Hardness as CaCO ₃	(")	34.00
Alkalinity as CaCO ₃	(")	39.00
Calcium as Ca	(")	8.00

Method / Equipment used. A.P.H.A. Standard method for examination
of water & sewage.

Tested by: *[Signature]*Checked by: *[Signature]*Technical Director. *[Signature]*

Our Reference: CRO- 9/12-6/80-81.

Date: 1st October, 1980.

Contd.(2).

CENTRAL RESEARCH ORGANIZATION

CONTINUATION
OF CERTIFICATE

<u>Sample No.</u>		<u>802/80</u>
<u>Sample Marked.</u>		<u>No. (1) Artesian well water.</u>
Magnesium as Mg	(p.p.m.)	4.03
Sodium as Na	(")	14.00
Potassium as K	(")	8.00
Chlorides as Cl	(")	12.77
Sulphates as SO ₄	(")	Not detected
Soluble Iron as Fe	(")	<0.10
Soluble Silica as SiO ₂	(")	17.50
Turbidity as SiO ₂	(")	Nil
Sediment	(")	Nil
Carbondioxide as CO ₂	(")	1.00
Dissolved Oxygen	(")	6.60
Phosphates as PO ₄	(")	Not detected
pH value		7.90

Tested by: *[Signature]*Checked by: *[Signature]*Technical Director. *[Signature]*

Our Reference: CRO- 7/12-6/80-81.

Date: 1st October, 1980.

- 10.11. Staking insufficient
no staking effect as leather is to wet. Machine is staking only the outside of the hides, leaving out the centre. Skins are too small for this machines, there is no staking effect.
- 10.12. Toggling "
condition to wet, drying temperature too high, distance from toggle to toggle to big
- 10.13. Drying after toggling "
temperature 50-60°C, waste of steam, resulting very hard leather
- 10.14. Grain buffing "
leather in uneven, many wrinkles and very hard. No level buffing is possible
- 10.15. Spraying machine "
Piling grain to flesh side is absorbing to much dust
- 10.16. Finishing solution "
Pigment: Binder ratio has been 200:200 should be only 100: 200
- 10.17. Embossing of "Zug grain" "
the time for embossing should be a few seconds. Kissplating is too short.
11. There have been check ups without adjustments at many process stages like:
- 11.1. Neutralization "
free acid has been found in the leather. The pH in the final leather did show the difference No. of 1.2
- 11.2. Chrometanning "
insufficient chrome has been offered on account of wrong calculation
- 11.3. Self reduction of chrome liquors "
using 5 times the quantity of the required sugar
- 11.4. Boiling test after chrometanning "
has been carried out very seldom, no adjustments, not noticing the under tannage
- 11.5. pH control in pickle, "
no difference for light-medium-heavy hides
- 11.6. Fixation of chrome at the end of the chrometanning "
- 11.7. Peltweight, the most important weight has not been available for cow hides "

Reporting Item 6A. Conditioning for Splitting till Shaving-weight

After the chrome tanning, the "wet blue" hides/skins are piled for 2-3 days or even longer for the fixation of the chrome.

Large hides have to be cut into sides, small hides remain uncut.

The sammying/setting machine should remove sufficient water to result the proper condition for the next ex-chrome splitting operation. The sammying/setting machine is not working properly. The setting out part of the machine is not working. Since nearly 6 month there has been no gear available to operate the rubber roller required for the setting out effect. Results are that only the sammying can be done, pressing very heavy double foldings in the wet blue leather. These foldings are difficult to remove and result heavy damage on the splitting machine. Also many hides are still too large, giving difficulties and additional damage on the splitting machine.

Though the folding problem is known, the splitting machine ex-chrome is running at the highest possible speed of 30 meters per minute. At such a speed the operators have no chance for any adjustment while feeding the hides into the machine. Every folding will be cut to holes in long stripes or so thin and uneven in thickness which cannot be levelled any more by the next shaving operation. Not sufficient care has been taken in proper feeding of the sides into the splitting machine. A very heavy trimming took place after the splitting in cutting more than only the damaged parts, reducing the size of the hides which means heavy loss of measurement.

Hides which should be finally shaved to:

1.5 mm substance, are split to 2 mm
1.7 - 1.8 mm substance, are split to 2.2 mm

There is nobody responsible for proper sizing and separation of the hides suitable for the above mentioned substance.

The next operation is a final thickness levelling of the wet blue hides by shaving to any required substance below 1.8 mm. Machine operators are careless in feeding the hides into the high speed knife cylinder. Many foldings, legs and belly parts are cut down resulting another heavy trimming. The trimming is like a rounding by "easy cutting", reducing the size of the hides again.

For the 2 shaving machines there are no spare knife-cylinders available. Reblading of the knife-cylinder did need 12 days, for the large size shaving machine, which means approximately 10 days loss of production.

After shaving and trimming, the shaving weight is taken on a kg. scale. All the chemicals for neutralization, re-tanning, dyeing and fatliquoring are calculated on this weight. Also here, the chemicals are taken on the lbs. scale. There is no control on the condition of the hides, whether they are to wet or dry for which adjustments are necessary to produce a standard quality.

The skins are more easy to be handled. After sammying, the skins are still too wet and go for shaving. The next operations are the same as for the hides.

B. Neutralization, retanning, Dyeing, Fatliquoring

For the undertanned hides with a very low pH, the neutralization has been insufficient. The neutralization of the acid has been only on the outerlayers of the leather, but no deep penetration to neutralize also the acid deep inside. The retanning agents for the "Zug grain" leather quality changed very often and the quantity used was too weak to result a proper embossing effect. For dyeing the black shade, 1% Nigrosine is being used. Only on the end, a not very stable fatliquor combination has been added which precepitated too early on the leather surface. The exhaustion of the retanning bath has been fairly good without any extra fixation. Finally the hides have been piled for a short time only for further processing.

The process for the skins has been somewhat better. The neutralization and retanning has been insufficient. The fatliquor has been added at the end only, precipitating mainly on the leather surface.

C. Sammying- Setting till Crust Condition

After the fatliquoring, the time for the fixation of all the chemicals is too short. The sammying/setting machine is working under a too low pressure, still removing unfixed chemicals, especially the surface fatliquor. The actual job of this machine is to remove all the foldings and wrinkles by a very heavy pressure setting. After the operation, the hides are folded and taken to the vacuum dryer for further setting and pre-drying. The hides are very slightly set out by a hand slicker on to the hot plates. Still many foldings are just pressed down. At the temperature of 80-85°C and a too short time, the leather is still too wet, it is removed from the vacuum dryer. Carelessly doublefolded the leather is piled on a steady horse. All the setting efforts by both the machines got lost. manually, piece by piece the hides are removed to another steady horse, again squeezed up before hang drying.

With hot air in the drying tunnel the leather will be fully dry at the next morning. As all the leathers have been still too wet before hang drying, every hide is rolling up too much during this drying operation. Also the leather quality is already very hard and bony. At the same day already the next operation waterspraying is carried out. The hard and rolled up leather is passing on a conveyer transport through the waterspraying machine. The water spraying on the flesh side is so heavy, everything else but no conditioning, as the leather is fully wet the next day. Also during the night the leather is not covered by plastic foil. The edges are somewhat dry and the inside completely wet, this is the condition the leather is reaching the staking machine. The staking operation with little effect is carried out and the toggling is started immediately. From toggle to toggle the distance is too big. The drying time for these very wet hides needs 5-6 hours at 50 - 60°C. Final result is a very hard and flat leather quality. Also the too wet leather has been overstretched during the toggling and will shrink back to the normal size after some time. The PFF(I) reported already that the leather is shrinking after punching out the pieces for the shoe upper leather. At the end the leather has become one size smaller than originally provided for.

There is the similar problem with all the skins. The 3 slowcomb type staking machines are not suitable for the skins at all. The skins are too small and only the edges can be reached by the staking head, but even these parts slip easily through and there is no staking effect. Also the distance from toggle to toggle is up to 8 - 12", a too big distance for this small skins.

Old stocks of crust leather with heavy mould

One lot of very mouldy leathers could be stoped before the staking operation.

To get rid of the mould, the following recommendation has been given:

Remedy: wash well in cold water

1. 200 % water 40°C
0.24% wetting agent 30 minutes
rinse for 15 minutes

2. 100 % water 40-50°C
0.2 % Cortymol G
0.4 % Synthetic Fatliquor)
0.2 % Synthetic oil) emulsify well,
add hot water
run 30 minutes
add formic acid to reach final pH 3.8
further processing as usual

Report Item 7

After toggle drying all the hides are trimmed again, cleaning of the adges before the finishing operation. Buffing is the first operation. As the leather is very hard and having many wrinkles, the buffing result is very uneven. Therafter pigment finishing is carried out on an automatic spraying or the most modern roller coating machine.

The leathers are piled up grain to flesh side. This piling is wrong as too much dust is getting stuck on the grain side. During the finishing operation the leather must be free of any dust from outside or from buffing.

The base coats are to hard and brittle. 200 parts of pigment are used with only 200 parts binder in the combination. After a few spray and 1 season coat the leathers go for "Zug grain" embossing. The embossing time is too short, the "Zug grain" is not very clearly pronounced.

Finally the leathers are going for measuring and in to the finished leather store.

Very few skins go for finishing the same way as the cow hides. Most of the skins are used for lining leather without pigment finishing.

The finishing chemicals are taken by volume, as no proper scale is available. These chemicals must be taken always by weight. Especially the different kinds of pigments are not the same in weight and volume.

For example:

- 1 litre white pigment, weight 1.36 kg
- 1 litre black pigment, weight 1.00 kg

Reporting Item 8

The following Laboratory equipment is available in the LF(R)¹ :

- 1 Bally Flexometer (12 test places)
- 1 Bally Penetrometer
- 1 Bally Tensometer
- 1 Bally Steifheitsmesser
- 1 Bally Permeometer
- 1 Satra Lastometer
- 1 Satra Rub fastness tester
- 1 Satra Permeability absorption machine
- 1 Martindale abrasion machine for sole leather
- 1 hot oven
- 1 battery pH meter with glass electrode

Physical and analytical tests have been carried out very seldom at RIT and CRO laboratories. Very few tests only have been made at the tanneries laboratory using above mentioned machines with very little knowledge.

The pH meter has not been adjusted to show the proper reading as no buffer solution has been available. The pH meter showing pH 6.2 for solutions which have pH 7.0. The pH paper available is also not very correct due to high humidity- discolouration.

Reporting Item 9

Selection of hides and skins at various stages:

1. Ex raw material for export	hides
2. Ex raw material for the tannery	hides
3. Ex raw material for export	skins
4. Ex lime	hides/skins
5. Ex wet blue	hides
6. Ex wet blue	skins
7. Ex crust	hides
8. Ex finishing for local market	hides
9. Ex finishing for export	hides
10. Ex finishing for local market	skins

To Item 1

Wet salted raw hides for export are selected into
 Grade 1/2/3 mainly
 Grade -/-/-/4 non standard
 only heavy cow hides are selected for export.

To Item 2

Wet salted raw hides for the tannery are selected into
 Grade 1, 2, 3 and light - medium - heavy
 sizing for purchasing price reason and preparation
 of soaking lots.

To Item 3

Dry salted raw skins are selected into
 Grade 1 and 2, no sizing, avg. 4 - 5 sqf/skin
 Only goat skins are selected and exported.

To Item 4

At present, there is no selection ex lime .

To Item 5

"Wet blue" heavy cow/ox hides only are selected into
 Grade 1/2/3 at 20/40/40 %
 Grade -/-/-/4 at -/ -/ -/100 %

To Item 6

"Wet blue" goat skins are selected into

Grade 1/2/3 at 20/40/40 %

Grade -/-/-/4 at -/ -/ -/100 % non standard
for export.

To Item 7

Crusted heavy cow/ox hides only are selected into

Grade 1/2/3 at 20/40/40 %

Grade -/-/-/4 at -/ -/ -/100 % non standard
for export.

To Item 8

No selection.

To Item 9

No selection - no export yet.

To Item 10

No selection

The main export items are according to priority:

Item 1, 3, 5

Very small quantities are also exported from

Item 6, 7

For the selection of all the export items, one team of
4 - 5 selectors from LF(R)1 and GIC are responsible.

Reporting Item 10

Not details are available regarding:

1. Yield (Rendement), Peltweight : sqf. calculation
2. Selection, Purchase price : final leather quality selection
3. Costing, Production cost for 1 sqf. of wet blue, crust or finished leather from light- medium and heavy hides, goat and sheep skins.
4. Chemical stock planning according to the production

Only 16 sqf. are mentioned as average size for 1 cow hide crust or finished leather from light- medium- heavy ox/cow hides over a period of 1 year. Process details are mentioned on a paper sheet with lot Nr. from soaking to chrome tanning only.

Process details for the retanning of hides and skins are kept at the Production Managers office. The Tannery has been without production for nearly 2 month on account of shortage of chemicals.

Reporting Item 11

One advertising catalogue, approximately 3-4 years old with some specifications for various export items is only available

The export orders are not many, the leather quality offered is of low standard and the sales prices very low in comparison with the international market.

Mainly "wet blue" heavy cow/ox hides are exported in full hides. There are problems in supplying the offered selection, grading 20/40/40, as the local heavy hide quality is much below this offer.

Report Item 12

Since the renovation of this factory approximately 4 years ago, local architects have planned and built effluent sedimentation pits (see Annex 8.1-9). These pits are completely blocked by heavy sludge, because the last cleaning took place more than 2 years ago. At present, all the effluent is bypassing these pits and is discharged directly into the "Creek".

In 1984, tannery effluent Analyses have been made, showing separately the results from different sections of the tannery. (see Annex 8, 8.1-9)

The test mentioned as "Main drainage" cannot be accurate as only one sample has been taken from the bypass to the "Creek", not containing the real effluent discharges from all the sections of the Tannery during one day.

The factory manager has been requested to order the cleaning of these pits to carry out chemical floccation tests and to produce a proper effluent test report.

Report Item 13

A very detailed maintenance programme is available, the main items are shown in Annex 7, Page 7.1- 28.

The implementation of the perfect maintenance programme differs very much from the planned programme. Many important spare parts are not in stock or have been ordered due to budget reasons.

The maintenance persons know the mechanism of the Tannery machinery but have not the experience to train the operators on all the machines. One maintenance engineer originally trained for these machines has been transferred to another non-leather factory.

The maintenance should also include all the scales in their programme to guarantee a proper weighing. All the scales are in a poor condition or out of order. For layout plan, see Annex 4, page 4/1 - 5.

Report Item 14

1. The transport inside the factory is generally very poor. Too many labourers are involved in pushing and moving the hides manually to the next operation.
2. For the raw hide transport, a simple wagon type cart with 4 rubber wheels is being used. These carts are in very bad condition.
3. Underneath the drums are no cage carts to collect the hides/skins after discharging.
4. Wooden horses are without wheels and cannot be moved. Hides and skins are piled manually near the machines and also have to be removed the same way.
5. Some old 3 wheel carts, not suitable at all for the transport in the Tannery are being used up to the finishing section.

Reporting Item 15 (B)

See Annex 1, 1/1 - 17

Reporting Item 16

From the 28.1. to 31.1.1985 a 4 day seminar has been held at the LF(R)1. Main items have been the 24 reporting items as well as technical demonstrations at the Tannery.
(see page 25)

The seminar has been opened by Representatives from the GIC and UNDP Rangoon.

Participants have been:

4 Persons from PFF(I)
1 Person from LGF(R)
1 Person from LF(R)2
5 Persons from LF(M)
11 Persons from LF(R)1

22

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The raw hide/skin collectors from all over the country could not be invited for this seminar.

GIC may decide on the best possible way to give those 141 collectors a proper information on how to improve the flaying without damage and the immediate salt preservation.

SEMINAR AT THE LEATHER FACTORY NO.(1)RANGOON

from 28.1.1985 till 31.1.85 9:30 - 12:00
13:00 - 16:00

By Mr. Max G. Haecker, UNDP

28.1.1985

1. Slaughter house flaying and preservation of hides and skins
2. Raw hides and skins, sizing, preparation for soaking
3. Processing from soaking till wet blue condition, selection ex lime, process details
4. Selection in the wet blue condition, storing of "wet blue" stocks
5. Practical demonstration
6. Discussions

29.1.1985

7. Process control
8. Process from sammying to crust condition
9. Process from crust to finishing
10. Physical and analytical tests in the laboratory, international standards for leather from hides/skins
11. Practical demonstration
12. Discussions

30.1.1985

13. Selection of crust and finished leather
14. Yield calculation - establishing lot cards
15. Marketing, price list, leather samples collection, order situation
16. Effluent
17. Practical demonstrations
18. Discussions

31.1.1985

19. Maintenance
20. Transport inside the factory
21. Up-to-date technology for quality improvement
22. Leather for shoe and leather goods factory
23. Production of self reduced chrome liquors, 3 stock solutions from sodiumbichromate

24. Experiments - stretching of football leather
25. Chemicals - Planning
26. Practical demonstrations
27. Final discussions
28. Closing Session

Reporting Item 17

The following factories have been visited:

1. Slaughter house Rangoon
2. Rangoon leather factory No.2
3. Leather goods factory Rangoon
4. Rangoon Institute of Technology
5. Peoples footwear factory Indaing
6. Leather factory Mandalay
7. Central research organization Rangoon

1. Visit to slaughter house Rangoon

Visited the Slaughter house Rangoon on the 22. November 1984 and discussed matters with the Chief of the sections.

Up till today the raw hides and skins have been collected by the truck from the Tannery from 11:00 till 13:00 hours, reaching the Tannery at 13:30 to 14:00 hours. The killing at the slaughter house is starting every day 10:30 hours. All the raw hides and skins are without any preservation, still full with blood, for approximately 3 - 4 hours. During Saturdays and Sundays the slaughter house is salting the hides /skins themselves. Salt is being supplied by the Tannery.

2. Visit to Rangoon Leather Factory No.2

Visited on the 19. December 1984. This factory is producing 80.000 lbs. sole leather and 400.000 sqf. splits for industrial gloves per year. There is also a small production of dog bite raw hide articles for export and dry salted raw skins according to orders available.

Future plans are to increase the sole leather production by 50% with the additional equipment of 3 large drums and 10 tanning pits.

The factory is equipped with six drums, two shaving machines, two buffing and one splitting machine (ex lime), one sole leather setting and rolling machine. All the machines are very old and outdated models. The production of sole leather is carried out in pits, drums, with a short pretanning time of 2 days. The total tanning time from soaking to the finished product needs approximately 8 weeks. The yield of the sole leather is not known and the Manager promised to run a test lot with the full calculation.

Sole leather production process details

1.	<u>Soaking</u>	Raw material	Ox/cow/Buffalo wetsalted
	water	300%	16 hours
2.	<u>Liming</u>		
	lime powder	10%	
	sodium sulph.	3%	5 hours
	water	200%	over night
3.	<u>Reliming</u>		
	lime powder	5%	
	water	150%	3 days
4.	<u>Fleshing</u> (by hand)		
	washing	300%	over night in pit
	water:		
5.	<u>Pickling</u> (in pit)	-Peltweight-	
	in pit		
	Calgon	1.5%	
	Sulphuric-	1.0%	
	acid		
	salt	5.0%	
	water	200%	2 days
6.	<u>Pre-tanning in drum</u>		
	Basyntan DLE	2%	8 hours + 16 hours stop
	Tanigan LD	2%	2 days
	Mimosa	5%	
7.	<u>Tanning in pit</u> (layers)		
	with local Byu or Ngu Bark		
		50%	7 days
8.	<u>Tanning in drum</u>		
	Mimosa	50%	2 days
9.	<u>Final tannage in pit</u>		
	Byu/Ngu bark	150%	7 days
10.	<u>Washing in drum</u>		
	water	30%	
	Basyntan DLE	1%	-Bleaching-
	Oxalic acid	0.5%	45 minutes

11. Fatliquoring

sulphated oil	2%	
raw oil	1%	45 minutes

12. Drying

normal hang drying in the shade, setting out with machine. After full drying, final finish on the sole leather rolling machine

3. Visit to Leather Goods Factory Rangoon

Visited on the 20.12.84 with Mr. Gorski from UNDP. At present they have orders for the local and export market. Main production: Industrial gloves made from textile and split leather. In the production programme are also sport shoes, boxing gloves, waist belts, hand bags, wallets, golf gloves and other leather articles. In future they are also interested to produce footballs if the leather quality is up to normal standard.

The annual production is still small.

During 1983/84 the total production has been:

1289 pairs Leather Shoes (assorted)

1074 pairs Leather Golf Shoes

132166 pairs Industrial Gloves

assorted Leather Goods Items

Total value: Kyats 1.96 lakhs

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There has been special interest in the following leather articles and quality:

1. Boxing gloves: from sheepskins without finishing in Red, Black and Brown.
2. Handbags/wallets: from goat and sheepskins, pigment finished with smooth surface and of soft quality. The colours should be Olive, Pink, grey, Black, Red-Brown, Beige.
3. Lining leather: from sheep and goat skins for shoes, bags and waist beltings. Colour shades Beige, Grey.

4. Shoe upper leather: from cow hides, soft standard quality, for local departmental demands. Specifications for light - medium and heavy duty in black, white and brown colours.
5. Football leather: 2.3 mm in substance, orange colour, water proof and fully stretchless, pigment finished in Black and White.
Handball leather: only chrome tanned without pigment finishing, natural colour, fully stretchless.

In our future plannings of trials in the Tanneries Laboratory the above mentioned leather qualities will be considered.

4. Visit to Rangoon Institute of Technology

Visited on the 23. January 1985. This Institut only has the equipment to carry out the following tests:

1. Physical tests: Tensile strength
 Elongation
 Tearing strength
2. Analytical tests: Cr₂O₃ content in the finished leather,
 Cr₂O₃ content in the waste chrome liquors
3. Testing the pH meter (battery type) from the LF(R)1

Leather samples from the old and new production have been handed over for testing.

Buffer solutions for adjustment of the tanneries pH meter have been received.

5. Visit to Peoples Footwear Factory Indaing

Visited by Mr. J.B. Gorski (UNDP)

Mr. M.G. Haecker

Daw Khin Myat Swe

U Myo Win

U Kyaw Khin Nyunt

U Min Lwin

meeting: U Tin Myint (Factory Manager)

U Thein Win (Production Manager)

and officers concerned

Present Production:

Combat boots(Leather) 1200 pairs per day

Jungle boots(Canvas) 1200 pairs per day

Working 2 shifts per day

The demand of leather boots is 300.000 pairs per year at present but is growing from year to year. They also produce leather jackets from sheep/goat skins of very poor quality .

For one pair of shoes they calculate 6 sqf. shoe upper leather. For 300.000 pairs of shoes made from leather they would need 1.800.000 sqf. leather for which approximately 112.500 hides of average 16 sqf. are required.

Leather quality: At present "Zug grain" shoe upper leather produced in LF(R)1 and LF(M) is being used. The quality is very poor, hard, not flexible and of low tensile strength. On the Lasting machine the problem is that the leather is cracking or tearing, also the leather is too hard and it is difficult to get the rounding at the front of the cap of the shoe.

For the first insole they use leather board and the second full sock insole "Zug grain" shoe upper leather.

For partly lining also "Zug grain" shoe upper leather is being used for stiffening the shaft. It has been mentioned that the present quality of the shoes will last only 6 month.

Garment Leather:

Pure vegetable tanned sheep/goat skins are being used. The leather is of poor quality, uneven colour, strong smell, very weak tensile strength and without finishing.

They found interest in our sample 7a from sheep skins, chrome tanned, beige colour which had been produced for boxing gloves. One lot of 20 pieces of sheepskins should be produced like sample trial 7a with cationic topping, without any pigment finishing.

Discussion:

Samples from the new production have been demonstrated, Soft "Zug grain", lining and glove leather, shoe upper leather from goatskins with polished grain. The quality of the shoes with the new soft leather and a new full sock insole, made from vegetable tanned sheep/goatskins, can be very much improved and the wearing time should be up to 12 month or even longer.

One sqf. of "Zug grain" leather used for the full sock insole is costing approximately 4.0 kyat and the vegetable tanned sheep/goat skin quality only 2.0 kyat per sqf. In addition, there is the advantage of the vegetable tanned leather in softness, breathing and absorbing moisture, not getting hot feet.

Disadvantage of "Zug grain" leather being used for full sock insole is hardness, no breathing, no absorption of moisture and getting hot feet.

Final cleaning/finishing of ready boots:

A mixture of casein, nigrosine, binder and water is being used for correcting the damages and defects. This solution is not absorbed well. We suggested to bring 3-4 pairs of combat shoes to LF(R)1 for improvement of the finishing mixture. During this time the new soft type of "Zug grain" leather from the new production will be handed over to produce a few pairs of shoes also with the new full sock insole for comparison.

Vulcanisation:

is done at 140° and 180°C for 10 minutes. For this high temperature operation the leather must be fully chrome tanned, otherwise the leather will shrink very heavily.

Shoe upper leather from goat skins, like test lot 1b, has been of interest. 20 goat skins should be produced for fine quality shoes and the low selection may be used for lining leather.

Futureplanning:

In future this factory will increase the production to 360.000 pairs of shoes out of which 50% are made from leather.

In the past, the Rangoon Leather Factory No.1 supplied approximately 700.000 sqf. of finished leather to this shoe factory, the balance of requirement from the Leather Factory Mandalay.

New production with improved leather quality

The durability of army shoes from the improved leather quality should be extended from 6 up to 12 month.

Training:

3 - 5 persons have been invited for the Leather Seminar from the 28. to 31 January 1985.

Consumption of Materials
for Combat leather Boots and PVC Boots/Shoes

Item No.	Particulars	A/U	Combat boot/pair	P V C shoe/pair
1.	Silicone	lbs	0.0055	
2.	R.S.S.	lbs	0.92	
3.	Zinc oxide	lbs	0.032	
4.	Stearic acid	lbs	0.024	
5.	Nonox B	lbs	0.008	
6.	P.C.C.	lbs	0.235	
7.	Pinter	lbs	0.05	
8.	Mineral rubber	lbs	0.117	
9.	Aluminium silicate	lbs	0.095	
10.	HSD	gal	0.0048	
11.	Vulcafor HBS/CBS	lbs	0.006	
12.	Vulcafor MBT	lbs	0.006	
13.	Vulcafor DFG	lbs	0.006	
14.	Sulphur D	lbs	0.024	
15.	Carbon black	lbs	0.47	
16.	"Zug grain"leather black	sqf	6.00	
17.	Fibre 3 mm	sqm	0.0486	0.0486
18.	Fibre 1.5 mm	sqm	0.047	0.047
19.	Sewing thread 60 black	met	27	-
20.	Sewing thread 40 black	met	26	25
21.	Hand tack 9/16"	lbs	0.011	0.0132
22.	Hand tack 3/8 "	lbs	0.0022	0.0088
23.	Machine tack 7 mm	lbs	0.0033	-
24.	Machine tack 8 mm	lbs	0.0066	0.0088
25.	Machine tack 9 mm	lbs	0.0088	0.0099
26.	Thermoplastic cement	kg	0.0015	0.0015
27.	Eyelet combat boot	pcs	42	-
28.	Laces cotton 64" black	prs	1.02	-
29.	Sticky rice	pyi	0.005	0.005
30.	Pigment finish black	lbs	0.03	0.015
31.	Polyester cement rod	kg	0.005	-
32.	PVC Granule black	kg	-	0.68
33.	Laces cotton 27" black	prs	-	1.02
34.	Lining cloth white 32"	yds	-	0.175
35.	Chrome leather black	sqf	-	3.00
36.	Goat skin leather	sqf	-	1.10
37.	Eyelet No.4 black	pcs	-	9.0
38.	Hardener Astra	kg	-	0.0063
39.	Adhesive Astra	kg	-	0.063
40.	Mould lubric.spray	bottle	-	0.0083

Specification of Leather Shoes

Size No.	Weight (kg)	Height of the heel (inch)	Thickness of sole (inch)	Height of angle (inch)	Length between eyelets (inch)	Length from heel to toe (inch)	Width of instep (inch)	Remarks
<u>Combat Leather Boot</u>								
5	1.1	1 1/8	3/8	8 3/8	1/2	10 3/8	3 5/8	
6	1.2	1 1/8	3/8	8 1/2	1/2	10 3/4	3 6/8	
7	1.3	1 1/8	3/8	8 5/8	1/2	11	3 7/8	
8	1.4	1 1/8	3/8	8 3/4	1/2	11 1/4	4	
<u>9492 PVC- Leather Shoes</u>								
5	0.49	1	1/2	3 1/4	5/8	10 1/4	3 1/2	
6	0.49	1	1/2	3 1/2	5/8	10 3/4	3 1/2	
7	0.50	1	1/2	3 1/2	5/8	11	3 3/4	

6. Visit to the Leather Factory Mandalay

Visited by: Mr. J.B. Gorski (UNDP)

Mr. M.G. Haecker

Daw Khin Myat Swe

U Myo Win

U Kyaw Khin Nyunt

U Min Lwin

meeting: U Tin U (Factory Manager)
 U Soe Aung (Production Manager)
 Dr. Karel Kubec (Chief of technical
 assistance team C.S.S.R.)
 and officers concerned

Present Production:

Still in the old factory they are producing 350 - 400 pieces light weight cow hides/day up to finishing to "Zug grain" for the PFF(I). The leather quality is similar as produced in Rangoon. The skin production is approximately 500 goat/sheep skins/day for various types of leather.

The estimated annual production:

900.000 sqf. shoe upper leather from cow/ox hides

200.000 pieces of skins

400.000 lbs sole leather

New renovated Mandalay Factory:

The new factory is still under construction and will need another 4-6 month until starting production.

This factory is planned to produce in future:

400 cow/ox/buffalo hides per day for shoe uppers

100 cow/ox/buffalo hides per day for sole leather

500 goat/sheep skins for various types of leather

The water quality has been mentioned 4.5 degree German hardness at the pH of 7.5.

Raw Hides/Skins:

All the supplies of raw materials are to 90% from the countryside and 10% from the slaughter house Mandalay. The size of the hides up country side is much smaller as in Rangoon.

The preservation is insufficient and needs improvement. If it could be possible to distribute salt free of charge to GIC collection representatives for further distribution to the butchers who are killing under license, the preservation could be improved effectively. The salt required for immediate presalting after flaying is approximately 4 - 8 kg, depending on the size of the hide. Also the resalting should be done at the collecting places.

Sole leather production: still in the old factory, using the old style tanning process. As soon as the new factory is in operation, the old factory will close down.

Present production:

7 days liming, 1 day handfleshing, 1 day reliming, 2 days in pits (layers), 3 days in tanning drum. Total time for the process 33 days. As tanning agents the local Byu and Ngu bark is used in combination with Mimosa. The local bark is used in large size pieces without leaching. Normally the bark is crushed to small pieces to leach out all the containing tanning content. Also the old tanning liquors are being used without any change and develop a very strong smell which remains still in the finished leather.

Yield Calculation: for sole leather has been mentioned with 3.6 lbs raw hide weight result 1.5 lbs of finished sole leather. This calculation is unusual and not correct. The proper calculation is based on the Pelt weight.

Technology of the new Mandalay Factory

It would be of advantage if the technology in the Rangoon and Mandalay factories could be the same, using the same chemicals and resulting the same leather quality for the local and export market. Commitments for export orders could be supplied by both factories. Purchasing of chemicals would be easier, the process and quality control could be done on the same instructions.

Effluent:

4 large lagoons have been built for the collection of all the tannery effluent without any treatment. It is expected that the water from the lagoons is leaking into the ground and being evaporated by the sun.

Findings and Recommendations

As the factory was still under construction we made no comments at this stage of renovation.

Lay out plan of the Mandalay factory, machine equipment etc. see Annex 6, Page 6.1 - 11.

7. Visit to Central Research Organization Rangoon

1. Discussed analytical tests for the leather samples we had prepared for testing.

Cr₂O₃ content in finished leather

Cr₂O₃ content in waste liquor

Fat content

pH in the leather (free acid test)

2. Collected distilled water and buffer solution

3. As no charges for the tests had been disclosed we ordered only to test the pH in the leather. Handed over 3 leather samples from the new production.

Reporting Item 18

No chrome tanning agents have been available for nearly 2 month. Small quantities of sodium bichromate could be found in the market and have been reduced at the tannery before my arrival.

Self reduction: 66 kg Sodium bichromate
 66 kg Sulphuric acid 65° Bè
 198 kg Water
 22 kg Brown sugar

The reduction has been done only 1 day before use, for the quantity of 2200 kg cow hides, calculated on the green fleshed soaking weight. The concentration of this local Sodium bichromate is not known. Usually the concentration is 50% Cr₂O₃ content.

2200 kg soaking weight are approximately 2860 kg Pelt-weight.

2% Cr₂O₃ should be offerd for a full chrome tannage on the Pelt weight

33.0 kg Cr₂O₃ for 2860 kg peltweight are 1.155 %
57.2 kg Cr₂O₃ for 2860 kg peltweight are 2.00 %

Result: This lot has been undertanned, using only half the chrome for a proper tannage.

Also the quantity of sugar which has been used for the self reduction has been much in excess.

Report Item 19

No Findings

Report Item 20

The chemical stocks for the factory are not properly planned. Buying chemicals by Tender requests, the lowest price items are selected and finally ordered.

Chemicals which are known only by name have been ordered and are being used without prior testing. Also no technical leaflets are available for newly arrived products.

Some chemicals arrive in large quantities, may be sufficient for many month, some main chemicals are not available even in small quantities.

The technicians at the Tannery have not so much knowledge about the chemicals and are facing big problems with so many changes of products. The leather quality will be effected also. Customers who order according to the demonstrated leather samples cannot receive bulk supplies of the same quality.

Report Item 21

Trimming at various stages is done much in excess. At the raw hide stage, many parts which are not usable for the leather production are not trimmed. The green fleshing is not done properly, too much flesh- meat is still remaining on the hides. The not trimmed waste and flesh-meat parts are heavy and chemicals are being used for these waste items from the beginning.

Splitting out of chrome: The sammying machine has no setting effect. Many under heavy pressure squeezed wrinkles and foldings - double foldings are pressed into the wet blue hides which are giving problems on the splitting-machine.

During the splitting operation, all the wrinkles and double foldings cannot be removed and are cut to holes or to such a thin thickness below the required substance on the next shaving machine. The damaged parts have to be trimmed before going to the shaving machine. The loss of measurement by this trimming after splitting is estimated to 1.5 - 2.5 sqf. per 1 hide.

Also the splitting machine is running too fast, at 30 meters/ minute, which is giving the operators no time for adjustment while feeding the leather into the machine.

Carelessness results in heavy damage on the shaving machine. Again heavy trimming after this operation. The loss of measurement at this stage is estimated to 1 - 1.5 sqf. per 1 hide.

The last trimming takes place after toggling before the leather is going for finishing. The edges and double foldings have to be trimmed as a smooth leather is required on the finishing machines for pigment coating. The loss of measurement at this stage is estimated to 0.6 - 0.8 sqf. per 1 hide.

The responsible persons doing the trimming don't understand what they are doing, using the "easy way" of trimming in cutting off too much.

Reporting Item 22

Leather Factory Rangoon No.1

Maximum Production Capacity of Hides and Skins per Year

A) Hide Production:

(Hides - pieces = full hides)

Possible Production: 45.000 hides for "wet blue" export

55.000 hides for further processing
to crust and finished leather

Total	<u>100.000 hides</u>

Average hide production:

150.000 light weight cow hides
 or 85.200 medium weight cow hides
 or 73.440 heavy weight cow hides

Total: 308.640 / 3

=====

avg. pieces 102.880 hides per year

=====

B) Skin Production

150.000 sheep/goat skins up to "wet blue",
 crust or finished

<u>Production figures:</u>	<u>Pieces per day</u>	<u>Pieces per month (20 working days)</u>
Cow hides, wet blue export	187.5	3750
Cow hides, for crust/finishing	<u>229.16</u>	<u>4583</u>
Pieces:	416	8333
	=====	=====
Skins, for "wet blue" crust/finishing Pieces:	625	12.500
	=====	=====

Actual Production

The actual production will be much less as the above mentioned capacity figures, on account of:

1. breakdowns of machines
2. shortage of electricity
3. shortage of chemicals
4. shortage of spare parts
5. shortage of raw material

If the majority of hides is of small sizes, the production figure will be much higher in pieces and if more heavy hides are used, the production figure will be lower.

The lime-and tanning section is together in 1 place, also the ex lime fleshing machine for skins is operating next to the chrome-splitting machine, which is of disadvantage.

Rated Capacity

The installed capacity: 105.000 hides per year
 150.000 skins per year

The rated capacity will be approximately 12% below
 the above figures during 1984 - 1985 on account of

Lack of raw material and chemicals	8 %
Shortage of electricity	1 %
Breakdowns of machinery and lack of spares	1 %
Unskilled labour	1 %
Shortage of water	1 %
	<hr/>
Total	12 %

These are estimated figures
 according to the present situation

Informations about Live-Stock in Burma

A. Live- Stock Population 1983/84 in Burma

Sr. No.	Commodity	Quantity
1.	Cow/Buffalo hides	11300000 nos.
2.	Goat/sheep skins	1300000 nos.

B. Actual Production 1983/84 in LF(R)1 and LF(M)

Sr. No.	Commodity	Actual Production
<u>Hides:</u>		
1	Chrome leather	88655 pieces
2.	Vegetable tanned leather	29333 pieces
3.	Crust leather	4545 pieces
4.	"Wet blue"	38270 pieces
Total		<u>160803 pieces</u> =====
<u>Skins:</u>		
5.	Sheep/goat	<u>463909 pieces</u> =====

C. Difference: Slaughtered to actual Production

<u>Hides:</u>	
Total slaughtered	382000 pieces
Utilised	<u>160803 pieces</u>
Not utilised	221197 pieces =====
<u>Skins:</u>	
Total slaughtered	717000 pieces
Utilised	<u>463909 pieces</u>
Not Utilised	253091 pieces =====

For the maximum Production Capacity at LF(R) 1, the following Machinery - Equipment is available

A. Drums

1. 1 Drum D28, 9 tons, 2½ and 5 RPM, soaking - tanning for hides, 4 days
2. 1 Drum D28, 5 tons, 2½ and 5 RPM, soaking - tanning for hides, 4 days
3. 1 Drum D10, 3 tons, 6 and 12 RPM, soaking - tanning for hides, 4 days
4. 1 Drum D10, 3 tons, 6 and 12 RPM, soaking - tanning for skins, 3-4 days
5. 1 Drum D10, 2 tons, 6 and 12 RPM, hides from Neutralization to retanning, dyeing and fatliquoring, to be used twice per day.
6. 1 Drum S 2.5, 450 kg, 6-15 RPM, skins from Neutralization to retanning, dyeing and fatliquoring, to be used twice per day.

B. Machines

- | | | |
|-----|-------------------------|--|
| 1. | 1 Sammying machine | :Hides, 400 - 600 pcs/day |
| 2. | 1 Splitting machine | :Hides, 500 - 800 pcs/day |
| 3. | 1 Greenfleshing machine | :Hides, 900 - 1100 pcs/day |
| 4. | 1 Setting out machine | :Skins, 1200 pcs/day |
| 5. | 1 Setting out machine | :Hides 500 pcs/day |
| 6. | 1 Shaving machine | :Hides, 500 - 550 pcs/day |
| 7. | 1 Shaving machine | :Skins, 500 - 560 pcs/day |
| 8. | 1 Hanging Dryer | :Hides 400 pcs/day |
| 9. | 1 Hanging Dryer | :Skins 900 - 950 pcs/day |
| 10. | 1 Fleshing machine | :Skins 2700 pcs/day |
| 11. | 1 scudding machine | :Skins 2700 pcs/day |
| 12. | 1 Setting/Sammying M/C | :Skins 925 pcs/day |
| 13. | 1 Vacuum Dryer | :Hides 200 pcs/day |
| 14. | 1 Vacuum Dryer | :Skins 1050 pcs/day |
| 15. | 2 Staking machines | :Hides 500 pcs/day |
| 16. | 1 Staking machine | :Skins 750 pcs/day |
| 17. | 2 Toggle Dryer | :Hides 200 pcs/day |
| 18. | 1 Toggle Dryer | :Skins 525 pcs/day |
| 19. | 1 Buffing machine | :Hides 525 pcs/day
for one operation only |

20.	1 Buffing machine	:Skins	1400 pcs/day for one operation only
21.	1 Dedusting machine	:Hides	1200 pcs/day
22.	1 Automatic Spraying Machine	:Hides/Skins	2145 pcs/day in one operation
23.	1 Hydraulic Press	:Hides/Skins	700 pcs/day
24.	1 Milling Drum	:Hides/Skins	
25.	1 Rotary coating M/C	:Hides	430 pcs/day
26.	1 Measuring machine	:Hides	900 pcs/day
27.	1 Rotary Ironing M/C	:Hides	280 pcs/day

Reporting Item 23

1. The present Layout plan, see Annex 13, page 13/1- 7, is showing that the ex lime skin-fleshing machine is installed next to the chrome-splitting machine, and the ex lime scudding machine next to the wet blue skin storing place without any separation.
2. 4 large size drums are used for the process from soaking - liming - deliming - pickling - chrome-tanning. 1 drum only is used for the neutralization-retanning - dyeing - and fatliquoring. All the drums are next to each other. Problems arise when 1 drum is being discharged after liming, the nearby drum after chrome tanning and the next drum after fatliquoring. There is no separation between the drums and no cage cars underneath these drums to avoid damage by chemicals.
3. The wet blue stocks of hides and skins are stored too far away from the sammying and splitting machine. There is too much transport inside the factory by a very poor transport system. Also the flow of work is interrupted.

Reporting Item 24

1. The factory has been well planned in choosing the most modern equipment from Europe. From the technical - technology side no consulting has been considered or requested.
2. Besides the most modern equipment, the Coutage Industry style of work is still too much practised.
3. The technical persons responsible lack experience and knowledge regarding chemicals - machines - process control and quality control.
4. Chemicals and main machine spare parts are not always available resulting in big losses of production.
5. The low quality of the leather, undertanned and also showing free acid, is difficult to sell. Some customers may be interested only in paying very low prices, much below the international market price.
6. The training of foreman and operators is insufficient.

- E N D O F F I N D I N G S -

- R E C O M M E N D A T I O N S -

Reporting Item 1

After inspecting the slaughter house and the procedure of flaying, the following improvements are possible.

1. Immediately after flaying the hides and skins should be removed to the tannery truck waiting outside for presalting. The preservation should start approximately 15 minutes after flaying. It has been demonstrated how to salt the raw hides and skins on the lorry. It has been suggested to use a plastic foil on the Lorry to avoid corrosion and damage by the salt.

Another alternative would be to have a pre-salting place very near to the slaughter house as permanent arrangement.

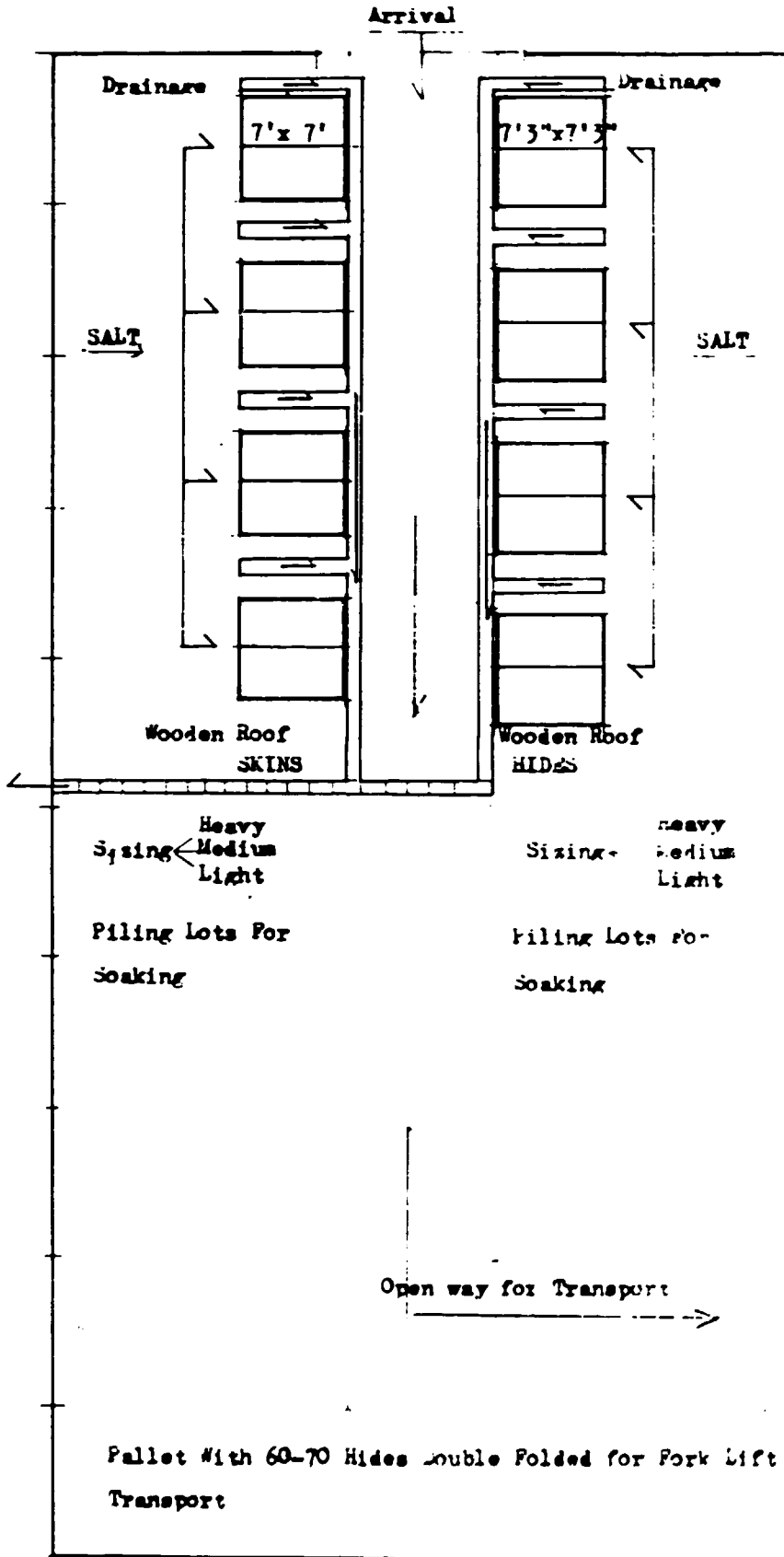
2. It is not allowed to bring salt into the slaughter house premises, as it would affect the quality of the meat.
3. The raw hides and skins are of national value and must be preserved immediately in the best possible way.
4. The same procedure should be extended also to the other slaughter houses all over the country, especially to the 141 small collecting places. Also at these places the flaying needs improvement, as many hides arrive at the tannery with many holes and flay cuts and cannot be used for the leather production. Most of the raw hides arriving at the LF(R)1 from the countryside are smelling and show heavy hairslip.

At the tannery the high stack piling should be stopped. Hides should be folded along the backbone, flesh side inside, hair outside. Piles should not be higher than 70 - 80 cm to avoid heating under heavy pressure. With this new piling, already on pallets, the number of hides can be fixed for easy counting and handling.

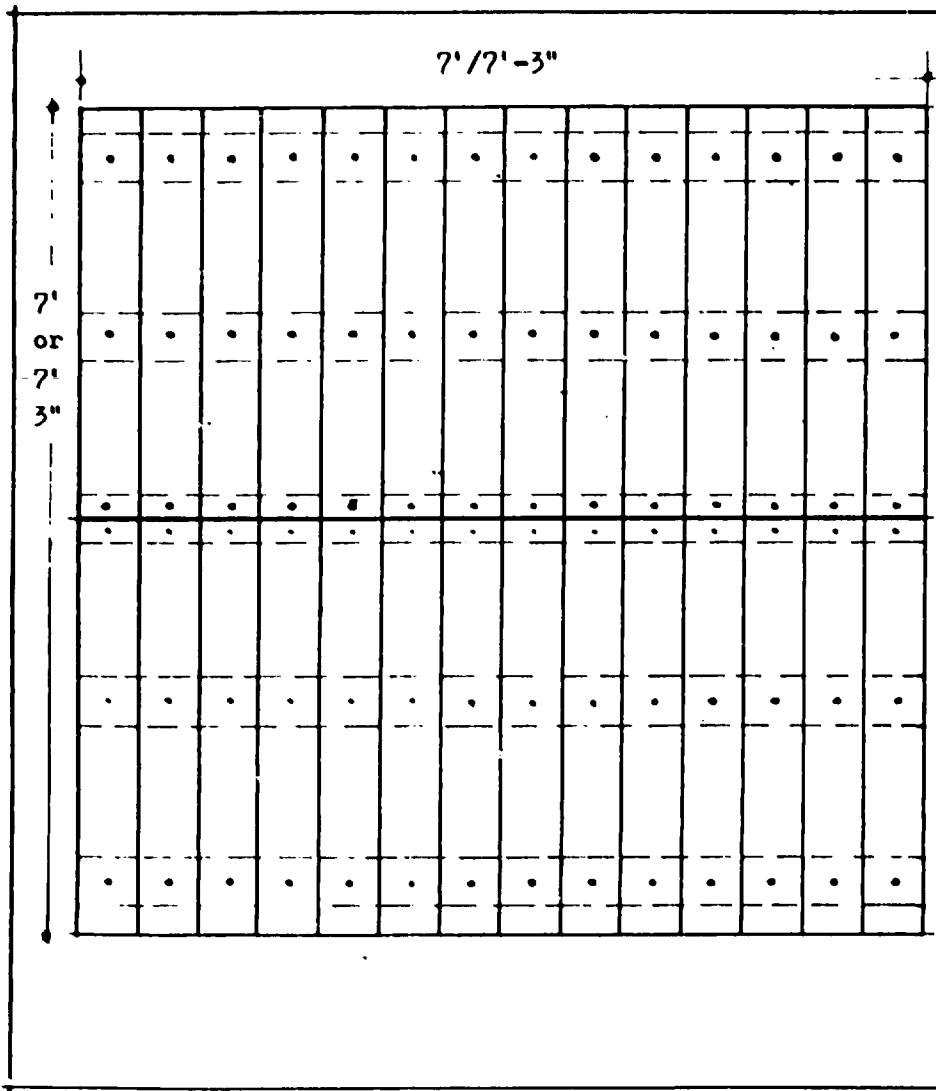
Temporary new raw hide store: with a low tin roof is not suitable for storing raw hides/skins, because the place is too hot. This place can be used only for storing "wet blue" hides and skins which are packed into plastic bags for export.

Future plans for 2 new raw hide store Buildings: These 2 buildings should be as cool as possible with a high roof of asbestos sheets and the inside arrangement as per enclosure, page 52 - 54.

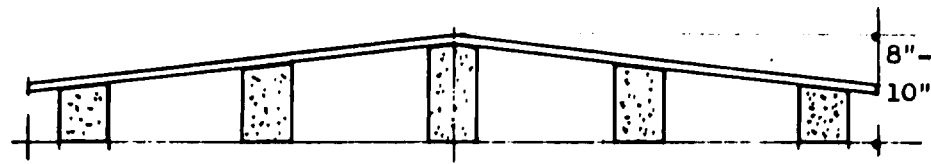
INSIDE PLANNING OF RAW HIDE STORE



RAW HIDE STORE (100' X 50')			1-1-05
U.I.C	FACTORY DESIGN GROUP I		89017



WOODEN ROOFS FOR SALT PRESERVATION



Side View

WOODEN ROOFS

For Salting Raw Hides/Skins

Wood Support Width approx. : 3"-4"

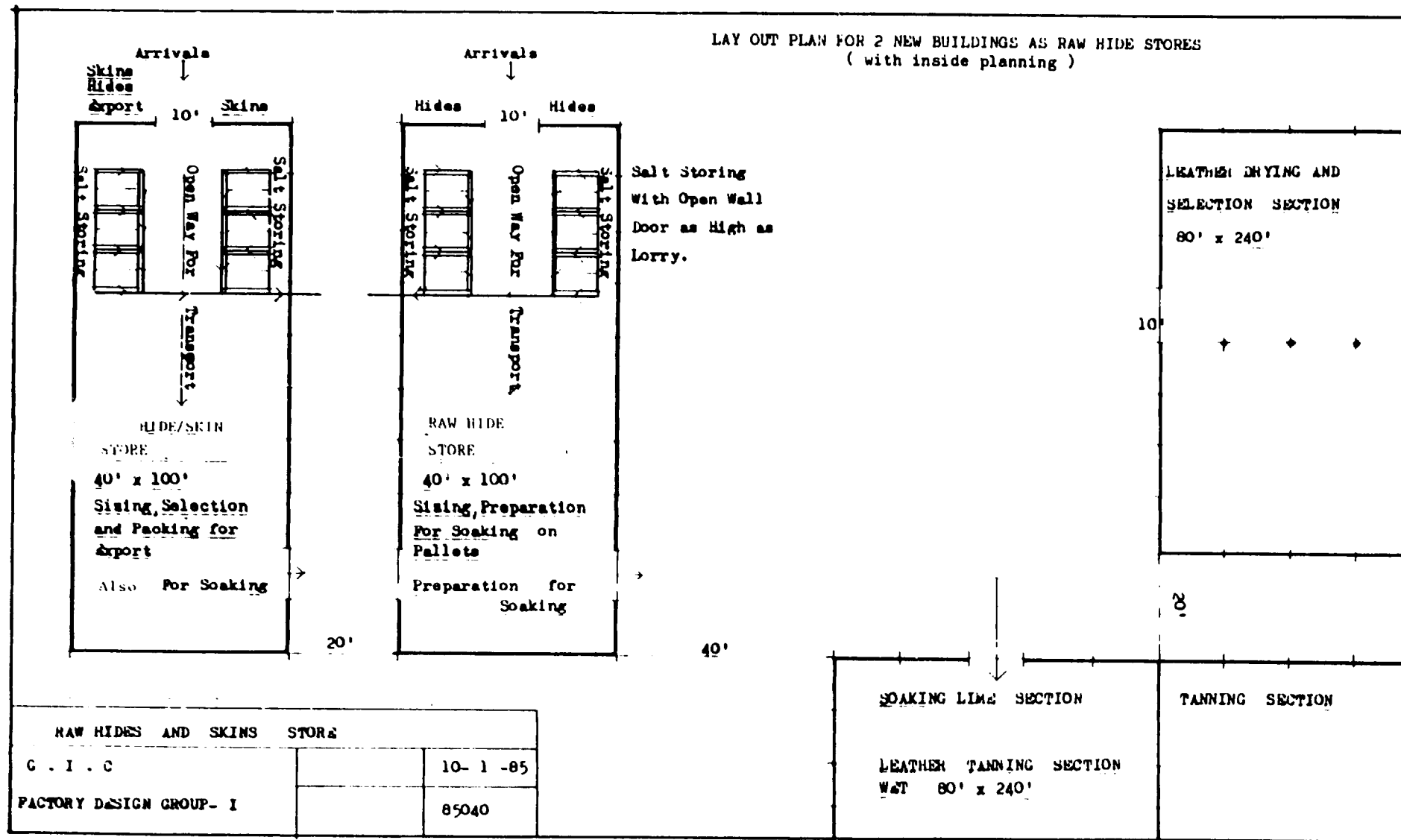
Brass Screws or Nails

Top Wood : 1" - 1 1/2"

Size: 7'x7' or 7'-3" x 7'-3"

WOODEN ROOFS FOR SALTING RAW HIDES/SKINS		
G. I. C	<i>Jrj</i>	1-1-85
FACTORY DESIGN GROUP-I		85020

LAY OUT PLAN FOR 2 NEW BUILDINGS AS RAW HIDE STORES
(with inside planning)



Reporting Item 2

- A. Hides: The proper sizing of hides into light - medium - heavy weight ranges is necessary for the preparation of soaking lots.
- Light hides, up to 11 kg : 1000 pcs. for 9 ton lots
 medium hides, 12 - 15 kg : 666 pcs. for 9 ton lots
 heavy hides, 16 kg up : 562 pcs. for 9 ton lots

- B. Skins: Goat and sheep skins should be kept separate and not be processed together.
- small size: up to 30") measured from neck to tail,
 medium " : 30 - 33") 2000 to 2500 skins for
 large " : 34" and up) 3 ton lots

The scale in the raw hide store is completely rusted and not weighing correctly. The maintenance should also take care of the proper weighing of all the scales.

- C. Priority should be given to raw hides and skins for soaking which arrive in bad preserved condition from the country side.

Dry hides and skins need approximately double the time for soaking as wet salted raw materials. In preparing the lots for soaking this condition should be controlled and dry hides and skins should be kept separate.

Reporting Item 3

- A. Soaking: The present soaking time for hides which have been piled in high stacks is insufficient. Also the soaking time for dry hides should be extended

Greenfleshing: Adjustment of the fleshing machine is required, different for light-medium and heavy hides. The flesh side of the hides should be as clean as possible, all the layers of meat and flesh should be removed. Care should be taken in not doing any damage to the hides. The knife cylinder of the machine should be sharpened approximately after fleshing 150 - 200 hides. It is wrong to increase the pressure instead of sharpening the knife cylinder.

A proper soaking process with a good greenfleshing will result in a level liming process with less wrinkles, foldings and drawn grain. In case of need, re-soaking after greenfleshing is advisable.

The time for the soaking process cannot be fixed, but must be adjusted according to the condition of the raw hides and skins. The process control should decide if the soaking process is completed or not.

- B. Liming: If soaking is completed, the liming chemicals are calculated on the green fleshed soaking weight for hides. For skins, the raw skin weight is taken. Before hides/skins go into the lime/sodium solution, the dehydration is important.

After greenfleshing, the hides are in perfect dehydrated condition for the lime/sodium solution. If resoaking is necessary after greenfleshing, draining out of the soaking water should be not less than one hour. The same must be done for the skins. In case of lime/sodium painting, the soaked skins should be piled for 1 - 2 hours for dehydration before the painting.

Suitable lime/sodium paint solution:

1/3 NAHS and 2/3 of NA_2S are made up to 15° Bè,
add lime powder to reach finally 26° Bè.

The liming process has been discussed and set as per details on pages 58 - 59 for hides, and on pages 60 - 63 for skins.

The factory water has been checked up:

28 - 30 C the normal cold water,
pH 7.3. The water hardness has been mentioned before.

Drum speed: should be the low speed during the liming process.

Liming chemicals: It is advisable to use 2/3 NA_2S and 1/3 NAHS to avoid excess plumping. 4% hydrated lime is sufficient, if the quality is fairly clean. NA_2S and NAHS should be added dissolved and diluted.

Peltweight/Lime selection: if the hides are remaining in the drum, only 1 chamber should be removed to obtain the average pelt weight. There is no lime selection possible at present, for hides.

For skins the process is slightly different. Skins go for fleshing after the liming process, ex lime selection is possible, also the pelt weight can be taken properly.

The Pelt weight is the most important and correct weight which must be taken for the calculation of:

1. chemicals for deliming-pickling-chrome tanning
2. yield calculation
3. costings

Production of Cow Hides from Soaking to "Wet Blue"

1 Lot out of the daily production,

Raw Hide weight: wet salted 9000 kgSoaking

20 min. 100% water speed 1

10 min. drain

100% water
 0.2% Amollan S
 0.2% sodium sulphide liquid 25°Bé
 16-24 hr. 0.3% Garmin K speed 1 End pH 9.-

Time switch as usual

Do not drain completely, discharge chamber after chamber, Greenfleshing

Soaking weight: 8000 kgLiming

return the greenfleshed hides to the drum, add

1.3% sodium sulphide liquid 25°Bé
 0.7% NAHS solution 25°Bé, dilute again
 both to 12°Bé

2 min. 2.0% hydrated lime powder speed 2

60 min. 10 % water speed 1

1.3% sodium sulphide liquid 25°Bé
 0.7% NAHS liquid 25°Bé
 10 min. 2.0% hydrated lime powder

50 min. 15 % water

16-20 hr. 40 % water

Time switch as usual

10 min. drain speed 1

10 min. 200 % water

drain speed 1

20 min. 200 % water speed 1

drain speed 1

Pelt weight: 11.000 kg (drum is overloaded)

Deliming

10 min.	200 % water	speed 1
	drain	speed 1
5 min.	40 % water	speed 1
15 min.	1.5 % Ammonium sulphate	
45 min.	0.5 % Sodium Bisulphite	
	0.1 % Amollan S	speed 1
or		
5 min.	0.5 % Decaltal N	speed 1
5 min.	1.0 % Ammonium sulphate	
15 min.	stop	
45 min.	0.5 % Sodium Bisulphite	speed 1
	0.1 % Amollan S	
30 min.	0.1 % Oropon OR	End pH 9.2
	Process control with	
	Phenolphthalein for full deliming	
	. drain	
20 min.	200 % water	speed 2
	drain	
20 min.	200 % water	speed 2
	drain well	

Pickle

5-10 min.	40 % water	
	8 % salt	6-7°Be
	Process control before adding acid	
	(The quantity of salt is depending very much on the moisture of the salt)	
2 hr.	0.5% Calcium formiate	
	1- 1.2% Sulphuric acid, 65°Be,	1:10 dil.
	add slowly	
	End pH 3.0 - 3.3	
	stop over night,	
	next morning check pH and adjust if necessary, run 30 min., check pH again	

drain out approximately 50 % of the pickle bath

Chrome-Tanning

60 min. 8 % Chrome Liquor 42°Bé or
4 % Chromosal B speed 2

30 min. 20 % water speed 2

60 min. 4 % Chromosal B speed 2

30 min. 20 % water, choose suitable temp. to
reach on the end 38°C.

Process control for pH and penetration

2 hr. Sodium bicarbonate 1:10, add slowly

After last addition of Sodium bicarbonate
run another 60 min., check pH 3.8- 4.0,
stop over night.

Next morning check pH again and adjust to
3.8-4.0.

The suitable temperature for the maximum
exhaustion of the chrome bath is 38-39°C.

Final Process control: pH, Boiling-Test.

drain

10 min. 100 % water speed 2
for first hydrolysis

drain

0.01 % Garmin K
20-30 min. 100 % water speed 2
for second hydrolysis

Discharge and pile for 48 hours

Remarks

1. 2 % Cr₂O₃ should be offered in the chrome tanning
2. pH before chrome tanning: 3.2- 3.4 for
light weight cow hides,
pH 3.0- 3.2 for
medium weight cow hides,
pH 3.0 for
heavy weight cow hides.

Processing of Goat skins up to "Wet Blue" Condition

Wet salted Goat Skins:

20 min.	150 % water	speed 1
		drain
	100 % water	
	0.2 % Amollan S	
	0.02 % Sodium Sulphide 25 ⁰ Bé	
16-24 hr.	0.03 % Garmin K	speed 1
	Soaking time according to the condition of the skins	
	Beginning pH 10- End pH 8	
	Time switch as usual	
60 min.		drain
	5-10 % water	
	0.5 % Mollescal PA	
	0.7 % NAHS 25 ⁰ Bé	
	1.3 % Sodium sulphide 25 ⁰ Bé	
60 min.	2.0 % hydrated lime powder	
	10.0 % water	
	2.6 % Sodium sulphide 25 ⁰ Bé	
	1.4 % NAHS 25 ⁰ Bé	
60 min.	2.0 % Hydrated lime powder	
24 hr.	40.0 % water	
	Time switch as usual	
		drain
	100 % water	
24-48 hr.	1- 2 % Hydrated lime powder	
	Time switch as usual	
		drain
20 min.	100 % water	
		drain
20 min.	100 % water	
		drain
20 min.	100 % water	
		drain well

Discharge chamber after chamber,
start fleshing, trim properly
machine-scudding and take Pelt- Weight:

Reliming. for very soft leather articles only,

150 % water
24 to 48 hr. 2 % Hydrated lime powder speed 1
drain
20 min. 300 % water speed 2
drain
20 min. 300 % water speed 2

Deliming

30 % water
0.8 % Sodium sulphite
1.0 % Ammonium sulphate
2-3 hr. (1.0 % Oropon OR
(0.5 % Amollan S End pH 8.8

Deliming chemicals should be increased if
reliming time is extended.

Process control: check cut with the Indicator
phenolphthalein for full deliming

20 min. 200 % water
drain
20 min. 200 % water
drain well

Pickle

30 min. 40 % water
7-9 % Salt Density 7 - 8 Bé

Process control: check Bé before adding acid

30 min. 0.4 % Formic acid, diluted 1:10
90 min. 0.5 % Sulphuric acid, diluted 1:10

stop over night

next morning adjust pH, if necessary
to pH 3 - 3.3

Drain approximately 50 % of the pickle bath

Chrome Tanning:

60-90 min. 16.0 % Chrome liquor 42°Bé
or 8 % Chromosal B
until full penetration

30 min. 40 % water

60 min. 0.5 % Implenal DC
% Sodium bicarbonate 1: 10 diluted
add slowly during 120 min.
to reach pH 3.8 - 4.0

120 min.

30 min. 0.03 % Garmin K
30 % water, choose suitable temperature
to reach 38°C on the end.

Stop over night, next morning
adjust pH again if necessary
to 3.8 - 4.0,
Run again 60 min. after the last
addition of Sodium bicarbonate.

Final process control: Boiling test

drain

10 min. 100 % water for first Hydrolysis
drain

30 min. 100 % water
0.01 % Garmin K for second Hydrolysis

Discharge and pile for 48 hours

Processing of pickled Sheep Skins for ExportSoaking

Normal as per factory process

Liming

Chemicals as per normal factory process
2 days

Re-liming

1 - 2 days

Deliming/Bating

Full deliming as per normal factory process

Pickling

10-15 min.	150 % cold water
	17 % salt, fully dissolved: 16-17°Bé
	+ skins
	0.02% Garmin K
2-3 hr.	2.0 % Sulphuric acid 1:5 diluted, add slowly in instalments

stop over night

next morning check pH 0.1 - 1.2

The pH must be stable

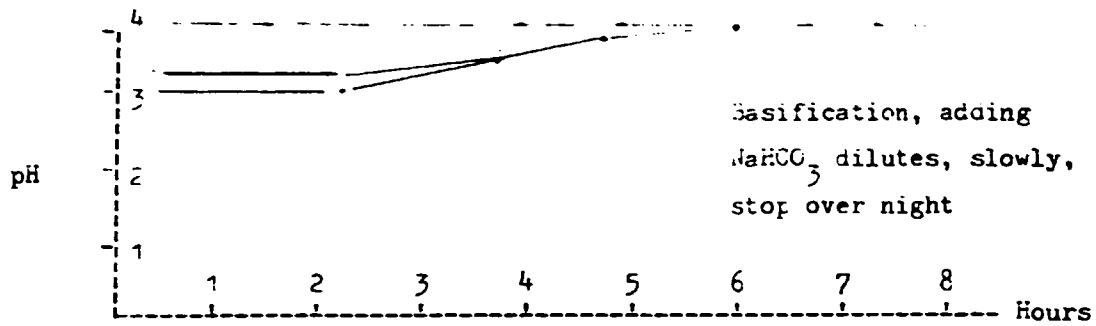
Remarks:

1. Remove skins from the pickle bath or drain out, pile properly for a few days.
2. Select according to orders in Grade 1 - 8
3. Pack in well cleaned old chemical drums, in dozen
4. Avoid that skins are getting dry before packing

CHROMETANNING GRAPHIC

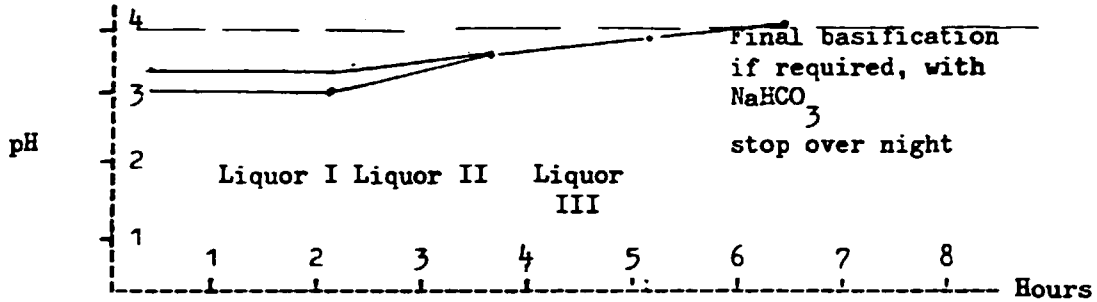
Hides

Table 1 : with chromosal B



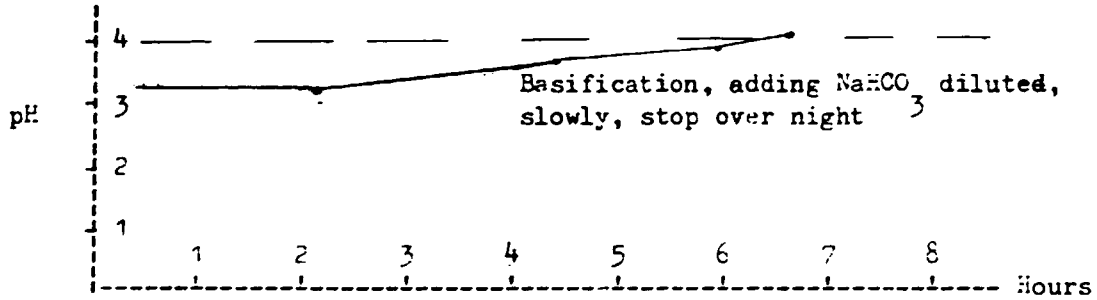
Hides

Table 2 : with self reduced chromeliquors



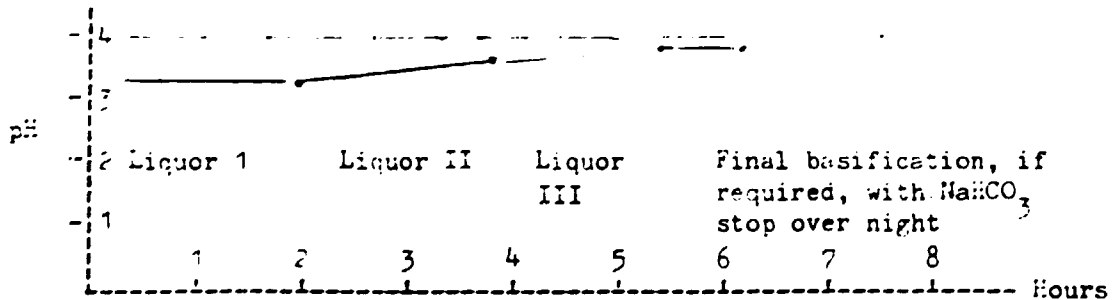
Skins

Table 3 : with chromosal B



Skins

Table 4 : with self reduced chromeliquors



Remarks : (1) There will be some pH and time difference for heavy, medium or light weight hides.

(2) Chrometanning agents - overleaf

Chrome Tanning Products:

1. Ready chrome tanning crystals: Chromosal B
2. Self-reduced chrome liquors from Sodium bichromate
 Chromosal B, 26 % Cr_2O_3 , price 7.832 kyat per kg
 Self-reduced chrome liquors, local purchased
 12.5 % Cr_2O_3 , price 9.90 kyat per kg

On account of the big price difference, Chromosal B should be used and should be always available. Self-reduced chrome liquors to be used only in case of need if there is any shortage. There are also other ready Chrome Tanning crystals available in the market which are self basifying and should be tested at a later stage, to avoid the basification with Sodium Bicarbonate.

Reporting Item 4A. New chrome tanned stocks

All these wet blue stocks are fully chrome tanned. 2 % Cr_2O_3 have been offered in the chrome tanning, calculated on the pelt-weight. Final pH on the end of the chrome tanning has been pH 3.8 - 4.0.

After chrome tanning, all the wet blue stocks are piled up for a few days for additional chrome fixation, if possible in a dark place and covered by plastic foil to avoid any drying out.

Piling should be done grain inside, flesh side outside. Piling on pallets in counted quantities would help easy transportation and calculation.

B. Old chrome tanned stocks

These wet blue stocks are undertanned. 1.1 - 1.3 % Cr_2O_3 only have been offered in the chrome tanning, calculated on the pelt weight. The pH is very low, which must be considered for further processing. Re-chroming is recommended as per trials carried out with approximately 3-4 % Chromosal B on shaving weight.

Packing of "Wet Blue" stocks for export

Strong plastic foil bags are used and covered with jute cloth. This packing is normal. The "Wet blue" hides or skins should not be dray before packing.

Reporting Item 5PROCESS CONTROL

for Cow/Ox/Buffalo-Hides and Goat and Sheep Skins
to guarantee a standard leather quality

1. Soaking
 - A. Proper sizing of soaking lots
 - B. Not overloading the drums
 - C. pH control
 - D. Adjustment of chemicals according to the local climate and condition of the raw materials
 - E. Proper soaking, no time fixing, according to the condition of the raw hides/skins, final check up if soaking is completed
 - F. Dehydration for approximately 1-2 hours before the soaked material is going into the lime/sodium liquors
 - G. Green fleshing on the machine as good as possible
 - H. Trimming, to remove all parts which are not suitable for leather processing
 - I. Soaking weight for hides as base for the calculation of the liming chemicals
 - J. Speed of the drums should be slowly, No. 1, speed 2 may be only for a very short time.

2. Liming
 - A. Short float at the beginning
 - B. To avoid excess plumping, use $1/3$ NAHS and $2/3$ Na_2S always dissolved
 - C. Adjust chemicals according to the local climate
 - D. Fleshing/Skins, do not leave out the centre parts unfleshed
 - E. Scudding on machine, after fleshing or also after the bating process
 - F. The drum speed should be always slowly, speed 1
 - G. Pelt weight, as base for the calculation of chemicals for delimiting/bating/pickle and chrome tanning, and also for yield calculation.

3. Delimiting
 - A. Temperature/Float control
 - B. check up full delimiting with the Indicator phenolphthalein.

- C. pH control, pH 7.5 - 8.5
 - D. Scudding after bating for goat skins, if required.
 - E. Speed of the drum 2 and 1
4. Pickle
- A. Bé control before adding acid, density should be above 6° Bé
 - B. The mentioned quantity of salt is only estimated, but depending on the moisture of the salt
 - C. pH control on the end of the pickle:
 - for heavy hides pH 3.0
 - for medium hides pH 3.0 - 3.2
 - for light hides pH 3.2 - 3.4
 - for skins pH 3.2 - 3.4
 - D. Speed of the drum 2
5. Chrome Tanning
- A. Check up pickle pH again
 - B. Reduce pickle bath by approximately 50 %
 - C. Use short float at the beginning
 - D. Offer 2 % Cr₂O₃ calculated on pelt weight
 - E. Speed of the drum 2
 - F. Run drum until full penetration of the chrome before beginning the basification
 - G. Add water to replace the reduced pickle bath
 - H. For maximum chrome fixation raise the temperature up to 38°C
 - I. Basify slowly with diluted sodium bicarbonate to reach the final pH 3.8 - 4.0
 - J. Boiling test as quick test
 - K. After discharging the chrome liquor, use 2 time water for the first and second hydrolysis.
 - L. Pile the chrome tanned material for 2-3 days for additional chrome fixation.
 - M. "Wet blue" stocks for export selection should be properly piled and covered to avoid drying out
6. Sammying-splitting- shaving
- A. Sammying with proper pressure and without double foldings, proper moisture.

- B. Speed of the splitting machine 17-20 m/min.
medium - heavy hides in sides
small hides in full pieces
- C. check up damages on the splitting machine
caused by careless feeding the machine
- D. Shaving, check up level thickness
- E. Check up damages caused by careless handling
- F. Trimming, only corner cleaning

7. Neutralization-Dyeing-Retanning-Fatliquoring

- A. Shaving weight: moisture control \pm 10-15 %
- B. Neutralizing pH 4.8 - 5.2
- C. pH cross cut of the leather: greenish-blue
- D. Drum speed 2
- E. Temperature control
- F. pH control before dyeing
- G. pH control end of fatliquoring: 3.8 - 4.0
- H. Exhaustion of retanning bath
- I. Rinse before discharging

8. Sammying-Setting-Vacuum Drying-Hang Drying

- A. Pile 1 -2 days before sammying-setting
- B. Heavy pressure on sammying-setting machine
- C. Vacuum machine, proper setting and timing
according to material and temperature of the
machine plates
- D. Careful handling till hang drying
- E. Full drying over night at lowest possible
temperature

9. Conditioning- Waterspraying

- A. Pile 2 - 3 days in conditioning room before
water spraying
- B. Spray controlled water quantity , pile over
night, covered with plastic foil, advisable
one days production in 3 piles
- C. Open always 1 pile only and send for staking

10. Staking-Toggling or Vacuum Drying

- A. Control moisture of material before staking
- B. Stake the butt portion with heavy pressure,
the belly parts with less pressure

- C. Toggle immediately or do final drying on the vacuum dryer
- D. Toggle dryer, temperature 30°C, drying time approximately 2 hours
- E. Control distance from toggle to toggle

11. Buffing-Finishing

- A. Trimming before buffing
- B. During finishing, pile grain to grain
- C. Dedusting from both sides
- D. Finishing chemicals should be taken by weight and not by volume
- E. Embossing time 2 1/2 - 3 seconds, at the temperature of approximately 70 - 80°C, pressure 230 ATM.

12. Final Remarks

Process details are mentioned clearly, but very often it has been noticed that the foreman are working differently, without any notes on the process paper sheet. 2 persons should be responsible to carry out a very strict process control in future, to guarantee a standardised process and a standard leather quality.

Reporting Item 6

The Sammying-setting machine before the ex-chrome splitting should be repaired as soon as possible. Without the setting effect to many double foldings and wrinkles are pressed into the hides which result heavy damages on the next splitting operation. Also the sammying pressure should be adjusted so that the wet blue hides have the proper condition for easy splitting

Sizing of the wet blue hides according to the substance for 2 different thicknesses for splitting.

Leathers which have to be shaved to the thickness of:

1.5 - 1.6 mm should be split to 2 mm

1.7 - 1.8 mm should be split to 2.3 mm

If the splitting machine is not operating properly, for safety reason, these figures should be changed to:

1.5 - 1.6 mm should be split to 2.3 mm

1.7 - 1.8 mm should be split to 2.5 mm

to guaranty an all over level thickness on the next shaving operation.

The speed of the splitting machine should be approximately 17 - 23 meters per minute to give the operators time for adjustment while feeding the machine. The backbone of the sides should preferably be placed against the knife to avoid additional damages.

After splitting, re-selection is possible to send the hides for shaving so that a level substance all over the hides is again guaranteed. To produce crust or finished leather for export, the leather thickness must be very even and accurate

Leathers which have been damaged by the splitting machine, especially in the butt parts, should not be selected for export and must be removed into the selection for the local "Zug Grain" quality.

The shaving machine is giving the final levelling of the leather thickness according to the orders. It is important that the wet blue material is all over level in substance. If this is not possible, re-selection is required to shave again to a lower substance. Thickness gauges are available for controlling. Operators should take more care to avoid damages while feeding the leathers into the machine.

Shaving Weight: is important for the calculation of all the chemicals for neutralization-retanning-dyeing-fatliquoring. The shaved material must be in proper moisture condition.

Adjustments are possible:

- if too wet, reduce the weight by approximately 5-15 %
- if too dry, increase the weight by approxim. 5-15 %

Retanning cow-ox-buffalo hides, goat and sheep skins

The process details have been set to produce a standard leather quality as follows:

1. Retanning cow-ox-buffalo for shoe uppers,
black colour see page 71
2. Retanning cow-ox-buffalo for shoe uppers
natural colour see page 72
3. Retanning cow-ox-buffalo for shoe uppers
light colour see page 73
4. Retanning goat skins for shoe uppers,
black colour see page 74

Retanning of cow-ox-buffalo for shoe uppers,
shaved to 1.5 and 1.8 mm, black

20 min.	300 % water cold	speed 2
		drain
<u>Neutralization</u>		
	100 % water cold	
15 min.	2 % Tanigan PC,PR or Basyntan MN	
	1 % Lipoderm liquor 1C or Derminol fur liquor HSP	
45 min.	2 % Calcium formiate	
	0.3 % Sodium bicarbonate	
		pH float 4.8 - 5.2
		pH cross cut with BCG Indicator: greenish
15 min	300 % water cold	drain
		drain well
<u>Retanning</u> without float		
15 min.	(1.5 % Lipoderm liquor 1C, Coripol VSL,DXL	
	(1.5 % Olinor 77 or Coripol DXL	
30 min.	(0.5 % Pellan S 1:4 hot dissolved	
	3-4 % Relugan RE,C, or Baytigan AR	
30 min.	3-4 % Tanigan LD,OS or QF powder	
40 min.	3-4 % Mimosa (Wattle extract) powder	
15 min.	200 % water 55°C	
<u>Fatliquor</u>	4 % Olinor 77 or Coripol VSL,DXL	
	(also 1% max be replaced by Coripol BZN	
40 min.	0.5 % Pellan S	
	0.5 % Olinor NL,or Coripol ICA	
5 min		pH control: pH 4.5
		% Formic acid to reach pH 3.7-3.8
30 min.	0.5 % Nigrosine dye, dissolved	
		pH control: pH 3.8 - 4.0
		process control for exaustion
		drain
15 min.	300 % water cold	
		drain
10 min.		rinse, discharge
24 - 48 hr.		Pile

Remarks: It is advisable to extent the piling time for fixation of all the chemicals being used in the retanning/ fatliquoring

Retanning of cow-ox- buffalo for shoe uppers or crust
shaved to 1.5 mm, natural colour

20 min.	300 % water	cold	speed 2
<u>Neutralization</u>			drain
	100 % water	cold	
	2 % Tanigan PR		
15 min.	1 % Lipoderm liquor	1C or Derminol fur	
		liquor HSP	
	2 % Calcium formiate		
45 min.	0.35% Sodium bicarbonate		
		pH float 4.8 - 5.2	
		pH cross cut with BCG Indicator: greenish	
		drain	
15 min.	300 % water	cold	
			drain well
<u>Retanning</u>	without float		
	1.5 % Lipoderm liquor	1C or Coripol VSL/DXL	
	1.5 % Olinor 77		
15 min.	0.5 % Pellan S		
30 min.	3-4 % Relugan RE or Baytigan AR		
30 min.	3-4 % Tanigan LD		
40 min.	3-4 % Mimosa (Wattle Extract)		
15 min.	300 % water	55°C	
<u>Fatliquor</u>	1 % Lipoderm liquor	1C or Coripol DXL/VSL	
	4 % Olinor 77	(also 1 % may be replaced by Coripol BZN)	
	0.5 % Pellan S		
40 min.	0.5 % Olinor NL or Coripol ICA		
		pH control: pH 4.4-4.5	
30 min.	% Formic acid	1:5 diluted to reach pH 3.8	
		process control for exhaustion	
		drain	
15 min.	300 % water	cold	
			drain
10 min.			rinse cold, discharge
24 - 48 hr.			Pile

Remarks: It is advisable to extent the piling time
for fixation of all the chemicals used in
the retanning/fatliquoring

Retanning of cow-ox-buffalo for shoe uppers or crust
shaved to 1.8 mm, light colour

20 min.	300 % water	cold	speed 2
			drain
<u>Neutralization</u>			
	100 % water	cold	
	2 % Tanigan PR		
15 min.	1 % Lipoderm liquor	1C or Derminol fur liquor HSP	
	2 % Calcium formiate		
45 min.	0.35 % Sodium bicarbonate		
		pH float 4.8 - 5.2	
		pH cross cut with BCG Indicator: greenish	
			drain
15 min.	300 % water	cold	drain well
<u>Retanning</u> without float			
	1.5 % Lipoderm liquor	1C or Coripol DXL/VSL	
	1.5 % Olinor 77		
15 min.	0.5 % Pellan S		
30 min.	3-4 % Rel gan RE,C	or Baytigan AR	
	1 % Mimosa (Wattle Extract)		
30 min.	1.5- 2 % Tanigan LD		
	1.5- 2 % Pellutax SWLF		
40 min.	1.5- 2 % Basyntan D		
15 min.	300 % water	55°C	
<u>Fatliquor</u>			
	1 % Lipoderm liquor	1C	
	4 % Olinor 77		
	0.5 % Pellan S		
40 min.	0.5 % Olinor NL	or Coripol ICA	
		pH control: pH 4.5-4.8	
30 min	% Formic acid	1:5 diluted, pH 3.7	
40 min.	1-2 % Tanigan 3 LN	or LD	pH 3.8
		process control: for exhaustion	
			drain
15 min.	300 % water	cold	drain
10 min.		rinse cold, discharge	
24 - 48 hr.	File		

Remarks: It is advisable to extent the piling time for fixation of all the chemicals used in the retanning/fatliquoring

Retanning of goat skins for shoe uppers or crust
shaved to 1.2 mm, black colour

20 min.	300 % water cold	speed 2
		drain
<u>Neutralization</u>		
	100 % water cold	
	1 % Calcium formiate	
20 min.	1 % Tanigan PC,PR or Basyntan MN	
45 min.	0.6 % Sodium bicarbonate	
		pH float 5.7
		pH cross cut with BCG Indicator: blue
		drain
15 min.	300 % water cold	
		drain well
<u>Retanning</u>		
	80 % water cold	
	2-3 % Olinor 77 or Coripol VSL/DXL	
15 min.	0.5 % Pellan S	
10 min.	2-3 % Basyntan D powder or Tanigan LD-OS/2F	
30 min.	2-3 % Mimosa (Wattle Extract)	
20 min.	2-3 % Relugan RE, C, or Baytigan AR	
20 min.	0.3 % Nigrosine dissolved 1:10	
15 min.	150 % water 55°C	
<u>Fatliquor</u>		
	3-4 % Olinor 77 or Coripol DXL/VSL	
	(also 1% may be replaced by Coripol BZN)	
	0.5 % Pellan S	
45 min.	0.5 % Olinor NL or Coripol ICA	
		pH control: pH 4.8
5 min.	% Formic acid to reach pH 3.8	
20 min.	0.3 % Nigrosine dissolved	
20 min.	% Formic acid	
		Final pH 3.8
		Process control: for exhaustion
15 min.	0.5 % Lipamin liquor NO	
15 min.	300 % water cold	drain
		drain
10 min.	rinse cold, discharge	
24 - 48 hr.	Pile	

Remarks: It is advisable to extent the piling time for fixation of all the chemicals used in the retanning and fatliquoring

Sammying - Setting out Operation

These 2 machines for hides and skins are not working with full pressure and the results are insufficient. There should be high pressure to remove the moisture as well as all the wrinkles and foldings out of the leather in preparation for the next operation on the vacuum dryer.

After efficient sammying-setting, the leathers should be piled well on a platform-transport without folding or scrambling up to spoil the setting effect, to the next operation.

Vacuum Drying Operation

Leather arriving from the sammying-setting machine are placed on the hot plates of the vacuum dryer, must be well set out by hand-slickers to remove all the foldings. The leathers should be completely flat before the machine is closing.

The timing must be adjusted according to the moisture and thickness of the leather. After the operation at approximately 80°C and 2 minutes drying time, the leather surface should show some predrying effect. The leather should not be too wet while removed from the plates. If the temperature is higher or lower, the time must be reduced or increased accordingly. After the operation is completed, care should be taken to remove the leathers from the hot plates on a transport platform or horse without spoiling this setting-predrying effect and move for hang drying.

Hang Drying in Drying Tunnel

The leathers hang up without any heavy foldings should be fully dry the next morning. Proper timing and temperature control is necessary. Too quick drying is resulting harder and slow drying in softer leather.

Very soft leather types should be dried without any heating, as slowly as possible.

Conditioning- Staking

After full drying in the drying tunnel, pre-conditioning should start by piling the leathers for 2-3 days or even longer in a room of high humidity. The leathers need recovering by absorbing moisture from the air. Only then the water spraying should be carried out.

Spraying water on the grain side of the leathers should be very level and controlled. Immediately piling will follow, grain to grain side, and the piles should be well covered by plastic foil. The persons responsible should know how much water on the spraying machine is required for every days conditioning.

The leathers going for staking should also be covered by plastic foil to avoid drying out of the edges. After staking, the leathers should be piled on a transport platform, again covered by plastic foil, before going for toggling. The conditioning and covering by plastic foil is important for the final leather quality, whether hard or soft.

The very old type "Slowcomb" staking machines available are not suitable for leathers to be exported and not at all suitable for skins. For quality improvement, especially for export, suitable machines

Vibration staking machine "Molissa type" for hides

Horizontal staking machine "Schoedel type" for skins would be required.

Care should be taken on the present staking machines to use full pressure only for the butt part and lower pressure for the belly parts of the hides.

To stake the skins on these machines is even more difficult and without efficiency. The size of the skins is too small to get a full staking effect. Especially the backbone and centre parts of the skins need a heavy staking which can not be achieved.

Toggling Frames

For hides, the distance between the toggles should be approximately 4 - 5 and for skins only 3 - 4 inches.

The drying temperature and time should be reduced from 50-60°C to 30°C and the time from 5 hours to 2 hours only. The steam consumption can be reduced considerably.

Final remarks: Tanneries in hot climate countries prefer wooden boxes on wheels, plastic lined covered with a lid for the conditioned leather transportation from water spraying to the toggle frames. (see page 78)

Reporting Item 7

After toggling, the leathers are handed over to the finishing department for trimming, buffing and dedusting.

On the buffing machine the grain side is slightly buffed or corrected, to reduce the grain defects. The

buffing operation must be as level as possible. In case of need the small size buffing machine should also be used for final levelling of the more thin belly parts.

The buffing dust must be removed by the dedusting machine as good as possible, otherwise the dust will be carried inside the finishing room.

Goatskins need a polishing operation to smoothen the grain side. For quality improvement, 1 stone polishing wheel, a very simple machine, would be required. At present a similar effect can be achieved on the small buffing machine, with old buffing paper from the back side.

Final Pigment-Binder Finishing

For the production of more smooth leathers, 1 curtain coating machine would be required for Impregnation, a filling base coat for the corrected grain leather before the final finishing.

1 spraying machine and 1 most modern roller coating machine are available. Mainly the "Zug Grain" type shoe upper leather for army combat shoes is in demand, for which both the machines are suitable, at present.

The finishing chemicals are taken by volume, but must be taken always by weight. The Pigment-Binder-Water combination has already been improved, using approximately

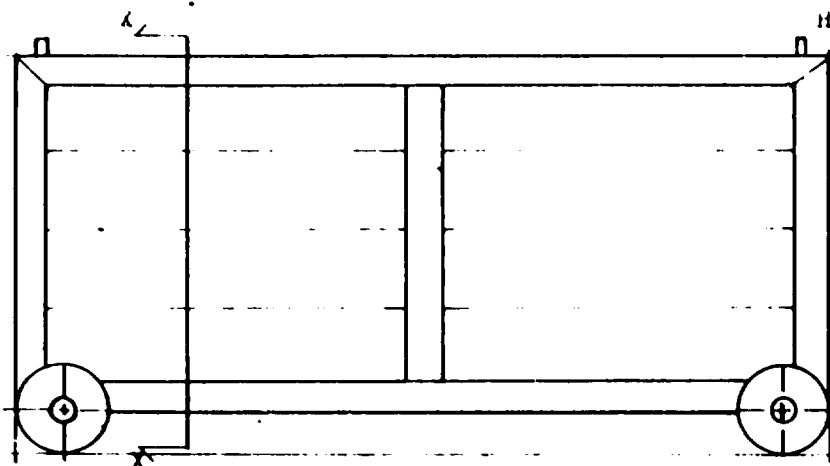
	100 parts pigment
	200 parts binder
400 -	500 parts water
	100 parts auxiliaries

More soft binders should be used in the base coats and slightly harder binders in the top coats before the final seasoning / fixation.

The leathers in the finishing room should be always piled grain to grain side to avoid that buffing dust from the flesh side is getting stuck on the pigment-binder film, which would result in roughness on the grain side.

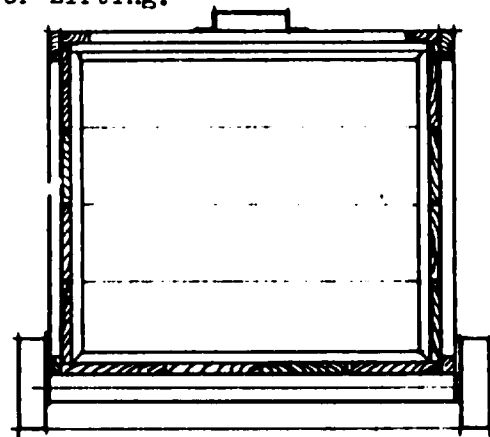
After full drying, embossing is done on the Hydraulic-press with extended timing to get a very pronounced grain print.

Finally, the leather is going to the measuring machine and to the finished leather store.

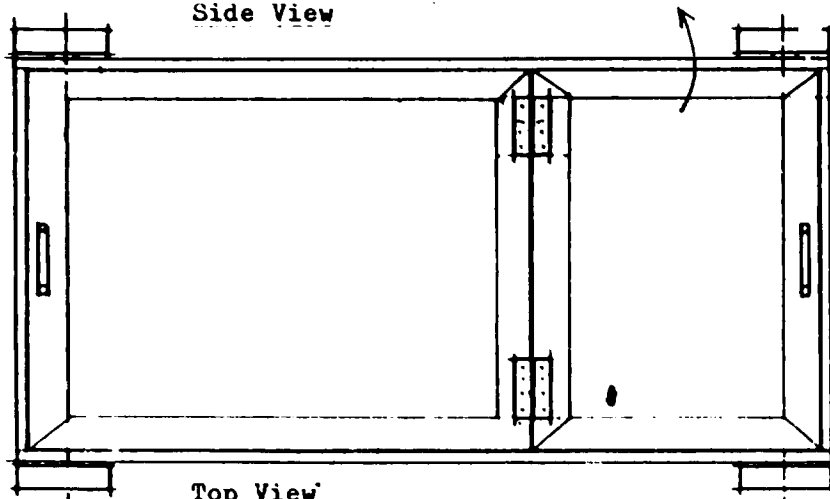


Side View

Handle for Lifting.



Section X-X



Top View

WOODEN BOX
 With Plastic Lining
 For Conditioning ^{from Water Spraying} to Toggling
 Top Lid Should Be Removable
 Length : 7'
 High : 3'
 Width : 3½'
 With 10" Wheels

WOODEN BOX FOR CONDITIONING TO TOGGLING		
G.I.C	<i>[Signature]</i>	1-1-85
FACTORY DESIGN GROUP- I		85021

Reporting Item 8Physical and Analytical Tests of Leather

A. Physical tests: for shoe upper leathers

1. Leather thickness
2. Tensile strength and elongation at break
3. Resistance to tear propagation
4. Stitch tear resistance
5. Flexometer
6. Tensometer
7. Lastometer
8. Wet and dry rub
9. Adhesion of film

B. Analytical tests:

1. pH in the leather
2. Cr₂O₃ content in the finished leather
3. Fat content in the finished leather
- (4. Cr₂O₃ content in the chrome waste liquors)

C. Responsible Persons for Process and Product Quality Control

2 Persons should be trained at the tannery, CRO or RIT Laboratories to carry out above mentioned tests.

All the test results should be recorded in 1 book. The Production Manager and persons responsible for process control and the foreman from the sections should be informed daily about these results. Date and signature will confirm that the information has been received.

The existing tannery Laboratory is only suitable for development, research, tanning and retanning, dyeing and fatliquoring trials, process control and testing of new chemicals.

Physical and Analytical tests must be carried out in airconditioned-acclimatised rooms with controlled humidity. A very suitable room would be the foreman's office in the drying section of the LF(R)1.

For Physical tests, 9 machines are already installed in the tanneries Laboratory.

For Analytical tests, no equipment available

UNIDO US\$ 5000.- Fund: The following items have been ordered in December 1984:

1. 1 electric pH meter
2. 1 analytical balance
3. 1 balance 0.1 - 1000 gm
4. 1 viscosity funnel
5. pH Paper- Be and thermometers
6. Buffer solutions for pH meter
7. Apparatus for producing distilled water
8. 1 leather tensile strength testing machine
9. 2 scales 1 - 100 kg

Physical Testing Machines-Tests

One test sheet has been established for physical tests, (see page 81). Tests on all the 9 machines have been carried out on the old leather quality to demonstrate the use of the machines. Further tests will follow as soon as the new leather quality is ready.

Analytical Tests

Only 1 test " pH in the leather " could be carried out at the tanneries laboratory, demonstrating the procedure of the test. Leathers from the old stock, old "Wet-blues" rechromed and retanned according to the new process have been tested:

Sample No.1 : Wet blue old stock, rechromed-retanned

Sample No.2 : Crust leather, old stock, black colour

Sample No.3 : Crust leather, old stock, black colour
very hard quality

<u>Test results:</u>	<u>pH</u>	<u>pH 1:10</u>	<u>difference value</u>
Sample No.1	4.0	4.4	0.4
Sample No.2	3.3	3.9	0.6
Sample No.3	3.2	4.2	1.0

The pH difference value should not be above 0.7, otherwise the leather contains dangerous strong free acid which will damage the leather fibre, weakening tensile strength during storing. One Test-Sheet has been established for Analytical tests. (see page 82)

Physical Test Report Sheet

Lot card No.

Colour:

1. Thickness of leather: mm

2. Tensile strength: kg/cm² Elongation: %

3. Resistance to tear
propagation: kg/cm

4. Flexometer:

5. Tensometer:

6. Lastometer:

7. Dry rub: 50 x

8. wet rub: 20 x

9. Adhesion (Tape test)

Date:

Date:

Date:

Production
Manager

Finishing
section

Laboratory

Date:

Date:

Tanning
section

Retanning
section

Analytical Test Report SheetLot card No.Colour

1. PH in the leather:

1: 10 _____

difference value: _____

2. CR₂O₃ content of finished leather: %3. CR₂O₃ content of "Wet blue" leather: %4. CR₂O₃ content of waste liquors: g/l

5. Fat content of finished leather: %

Date:

Date:

Date:

Production
ManagerTanning
sectionRetanning
section

Date:

Laboratory

Remarks: Additional tests may be carried out if
requested by customers.

For Analytical Tests to be carried out at the tanneries laboratory, the following chemicals and equipment is required:

Tests	Chemicals	Apparatus & equipment
Determination of oil & fats	1. Petroleum ether S.B.P. 60	1. <u>Soxhlet apparatus</u> a. Condensor b. Extractor c. Receiving flask 250 ml d. Thimble 2. Water bath 3. Balance 4. Oven 5. Sample grinding machine

Determination of CR_2O_3	1. Hydrochloric acid 2. Sodium hydroxide 3. Hydrogen peroxide 4. Potassium iodide 5. Sodium Thio-sulphate 6. Starch 7. Distilled water 8. Soda ash 9. Potassium carbonate 10. Fused borax (iron & aluminium free)	1. Furnace 2. Hot plate 3. Platinum crucible 4. Dropping funnel 5. Filter paper 6. Funnel 7. Conical flask 8. Beaker 9. Buerette & stand 10. Pipette & stand 11. Measuring flask

International Specifications for Hides -Skins

see Annex 9, page 9/1 - 12

Instructions for Physical Tests

see Annex 10, page 10/1 - 4 for:

1. Leather thickness
2. Tensile strength and elongation
3. Resistance to tear propagation
4. Stitch tear resistance

Instructions for:

1. Flexometer
2. Tensometer
3. Lastometer
4. Wet and dry rub
5. Adhesion of finish

are available on the machines in the tannery laboratory

Instructions for Analytical Tests

see Annex 10, page 10/5 - 13, for:

1. PH in the leather
2. CR_2O_3 content in the finished leather
3. CR_2O_3 content in wet blues
4. CR_2O_3 content in waste liquors
5. Fat content in the finished leather

Reporting Item 9

The Selection of hides and skins in tanneries is very important.

Selectors are specially trained and employed as highly paid persons for accurate selection at various stages of the process. Hides and skins suitable for the required purpose must be separated already in the early process, if possible.

1. Good quality hides and skins should be used for high quality leather only, achieving the highest sales price.
2. Medium quality leathers may be still improved in the process to be sold at the best possible price.
3. Low quality leathers, some may be still improved in the process, may be sold still at a good price. For example corrected grain leather, embossed for shoe uppers, smooth grain.
4. The lowest leather quality from hides is only used for heavy embossing, by which all the defects are covered. For example, "Zug grain" for army boots, selling still at reasonable prices.
5. The lowest leather quality from skins is being used mainly for lining leather, selling at a low price.

The selection of "Wet blue" and crust leathers from hides and skins has been carried out in the factory with the selectors to standardise the grading for export.

The " Selection Instruction Manual " contains the results and instructions.

For the " Selection Manual "
see Annex 11, page 11/1 - 8

Reporting Item 10

Lot cards have been established, showing all the required details from the raw hide purchasing till the sales price.

These new lot cards, after filling in the required details at the tannery, should be handed over to the planning section for final calculation. Also the daily chemical consumption is very helpful for chemical-planning and proper stock keeping.

For hides and skins different coloured cards may be printed for easy filling in the data, like:

1. Lot No.
2. Raw Hide/Skin weight and sizes
3. Purchasing cost price
4. Green fleshed weight
5. Pelt weight
6. Shaving weight
7. Selection ex wet blue or crust (at present)
8. Selection for Skins also ex lime
9. Total chemical consumption
10. Chemical stock keeping - planning
11. Production cost for light weight hides
 - " medium weight hides
 - " heavy weight hides
 - " goat skins
 - " sheep skins
12. Yield calculation: peltweight : final sqf.
13. Daily production figures

The production capacity of leather for finishing is 560 sides per day during 8 hours working shift. Overtime or 2 shifts could easily increase the production up to 1000 sides per day. (see page)

LOT CARD: HIDES/SKINS

FRONT SIDE

DATE:	LOT NO :	PIECES	KG.	USED CHEMICALS			USED CHEMICALS			TOTAL	
				NAME	Kg.	Kg/price	Total cost	NAME	Kg.		Kg.price	cost
<u>Soaking: Weight:</u>				Salt				Mimosa			
Cow				Garmin K				Tanigan OS			
Buff				Soda ASH				Basyntan LD			
Goat								" " D			
Sheep				Amollan A conc							
Green fleshed weight				Lime powder				Relugan RE			
Pelt weight				Na ₂ S				" C			
Shaving weight				NAHS				Baytigan AR			
Vacuum Drying								Pellutam			
Conditioning Start				Ammon.sulphate				Olinor 77			
Togging				Sodium Bisulphite				Pellan S			
Total sqf.				Oropon OR				Olinor NL			
Yield				Sulphuric Acid				Lipod.liquor 1C			
WET BLUE SELECTION				Formic Acid				Coripol ICA			
PRICES				Chromosal B				" VSL			
%				Reduced liquor				" DXL			
Grade 1				Calcium Formate				" BZN			
" 2				Sodium Bicarbonate				Derminol fur			
" 3				Tanigan PC				liquor HSP			
" 4				Basyntan MN				Preventol L			
" 5				Tanigan PR				Nigrosine			
" 6											
" 7											
REJ											
							1.Total				2.Total

REVERSE SIDE

USED CHEMICAL NAME	Kg.	Price per Kg.	Total cost	REMARKS	FINAL EXPENDITURE	
					NAME	VALUE
Pigment Black					Raw hides/skins	
Binderency IE					Chemicals 1	
" OHN					" 2	
" OBN					" 3	
" S						
Luron Binder U cone					Wages	
Astacin soft PU					Factory V / O-H	
" finish PUD					" F / O-H	
					AdminisTR/ O-H	
					S+S / O-H	
Lepton WAX						
" Filler B						
Corial WAX G						
Formal DEHYDE						
Amollan IP						
Ethylglycol						
Ammonia						
					Total cost:	
					Total (sqf)	
					Sales price	
					Diff + /-	

3 Total:

Reporting Item 11

The marketing need a complete overhauling.

1. The following leather items could be produced by LF(R)1 and LF(M) as mentioned on page 88.
2. Both factories should use the same technology, but their own Research and Development. Both combined only are able to complete Export Orders commitments.
3. Also the purchasing of chemicals will be easy with limited numbers of products for a standardised process.
4. Price lists, see page 89-90 have been given as information from the international market to compare the present Burma prices.

Many leather buying customers send their own technicians or selectors for inspections of the goods until packing. There are no special forms for delivery. Only information-data can be given for which the supplier is able to give full guarantee, otherwise it can be used against him in claims. There may be very friendly customers also who cooperate very closely regarding technology and might request to use the process which they recommend or where process informations may be given.

The 3 - 4 years old advertising catalogue should be newly designed, with photos from both the new factories on the front page. The contents should be changed with up to date informations for many more leather items. Still, the catalogue only is insufficient.

Leather samples should be given along with the catalogue to show the customers the real leather quality. Important customers should get the large sample collection, for small new customers a collection of small samples or shade card may be included in the catalogue.

The persons responsible for marketing should plan more travelling and advertising outside Burma:

1. more contacts to leather buyers
2. more advertising in foreign Journals
3. more visits to leather fairs, Paris etc.
4. more contacts to Embassies in Burma
5. The international market situation and the ruling prices are most important. Also up to date informations and samples should be collected.
6. Important customers who would like to visit Burma should have an easy entrance visa for Burma arranged prior to their departure or on arrival.

Various Types of Leather which can be produced
by LF(R)1 and LF(M), listed according to priority.

<u>For Export</u>	<u>Cow</u>	<u>Buffalo</u>	<u>Goat</u>	<u>Sheep</u>
	<u>Ox</u>			
1. Natural crust for shoe upper	x	x	x	-
2. Coloured " " " "	x	x	x	-
3. "Wet blues"	x	x	x	-
4. "Zug grain" Army leather	x	x	-	-
5. Smooth grain shoe uppers	x	x	x	-
6. Suede for shoe uppers	-	-	x	-
7. Suede for garments	-	-	x	-
8. Upholstery	x	x	-	-
9. Shrunken grain	-	-	x	-
10. Snake Skins	-	-	-	-
11. Baby crocodile	-	-	-	-
12. Raw hides and skins	x	x	x	-
13. Pickled skins	-	-	x	x
14. Dry limed dog bite	x	x	-	-

For the local Industry: PFF(I), LGF(R)

1. Zug grain for shoe uppers	x	x	-	-
2. Smooth grain for shoe uppers	x	x	-	-
3. Splits for Industry-Gloves	x	x	-	-
4. Butts for Footballs	x	-	-	-
5. Butts for Volleyballs	x	-	-	-
6. Butts for Handballs	x	-	-	-
7. Butts for Rugby/soccer balls	x	-	-	-
8. Full grain skins for Boxing Gloves	-	-	-	x
9. Lining, chrome and veget. tanned	-	-	x	x
10. Full grain for Garment/Handbags-	-	-	x	x
11. Suede for Garments/Handbags	-	-	x	-
12. Suede for Shoe Uppers	-	-	x	-
13. Shuttle cock leather	-	-	-	x
14. Waist Belt leather, stretched	x	x	-	-
15. Shrunken grain	-	-	x	-
16. Upholstery	x	x	-	-
17. Sole leather, veget.tanned	x	x	-	-

International Selections and Prices

From countries who have the same quality of raw materials as Burma.

	<u>Foreign Port</u> <u>c and f</u>
1. <u>Wet blue cow hides</u> sides 12-14 sqf avg.	
Selection 5/35/60	0.86 US\$ per sqf.
" 5/35/35/25	0.84 " " "
" 5/25/35/35	0.82 " " "
" 5/20/20/20/20	0.80 " " "
" -/-/25/25/25/25	0.70 " " "
2. <u>Crusted cow hides</u> sides 12-14 sqf avg.	
Selection -/-/50/50/-	0.86 " " "
" -/-/-/-/50/50	0.81 " " "
" -/-/-/-/-/100	0.59 " " "
" 5/20/30/45	0.96 " " "
3. <u>Wet blue goat skins</u> 50 - 60 sqf. per dozen	
Selection 10/30/60	48.- " " "
" -/-/-/100	26.- " " "
4. <u>Crusted goat skins</u> 50 - 60 sqf. per dozen	
Selection 10/30/60	50.- " " "
" -/-/-/100	28.- " " "
5. <u>Wet blue sheep skins</u> 50 - 60 sqf. per dozen	
Selection 4/6/10/20/25/35	70.- " " "Europe
	73.- " " "Japan
6. <u>Crusted sheep skins</u> 50 - 60 sqf. per dozen	
Selection 2/6/10/15/33/34	70.- " " " "
7. <u>Crusted sheep/goat skins lining</u> 50 - 60 sqf. per dozen	
coloured - no selection	60.- " " "
Selection -/-/-/20/30/50	63.- " " "

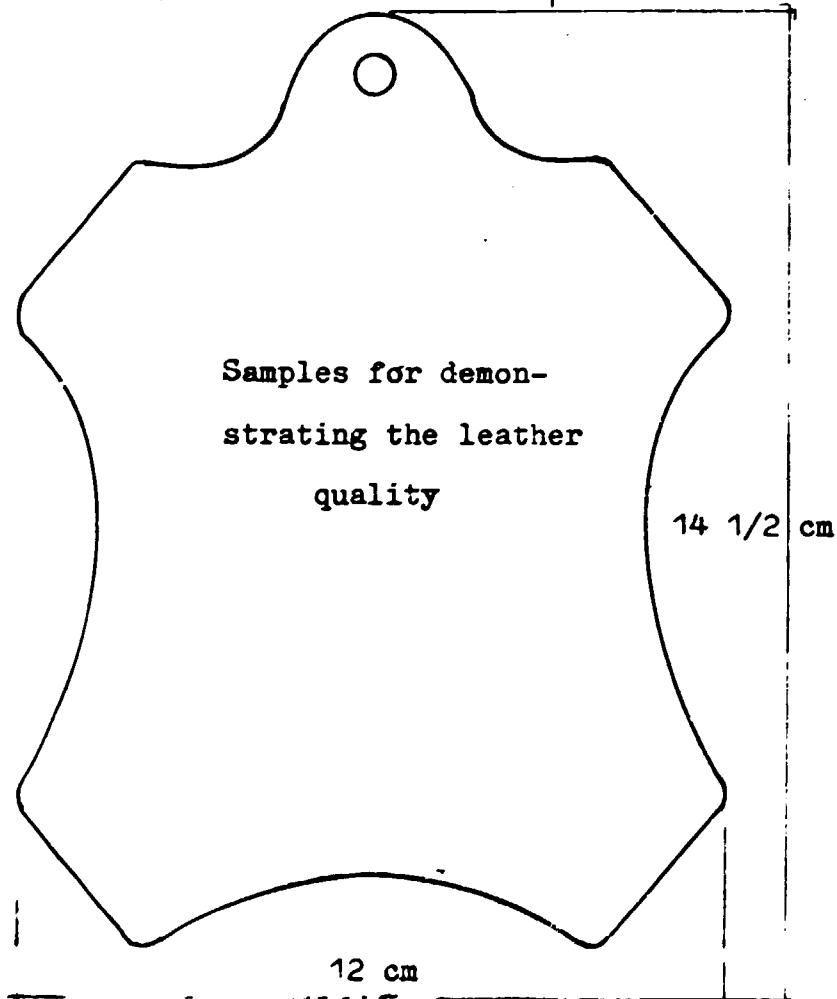
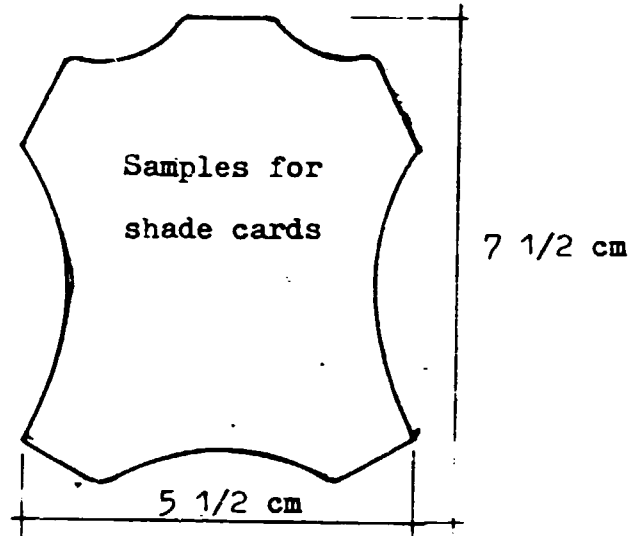
8. Crusted sheep skins, natural colour

<u>Size / piece</u>	<u>Percentage</u>	<u>Selection</u>	<u>Price per sqf.</u> <u>U.S.Dollars</u>
3/5 sqf.	10/20/35/35	I/II/III/IV	130 cents
3/5 "	20/40/40	IV/V/VI	100 "
4/9 "	10/20/35/35	I/II/III/IV	140 "
4/9 "	20/40/40	V/VI	110 "
4/12 "	10/20/35/35	I/II/III/IV	140 "
4/12 "	20/40/40	V/VI	110 "
4/10 "	100	VI	90 "
4/10 "	50/50	VI/VII	85 "

9. Crusted goat skins, natural colour

<u>Size / piece</u>	<u>Percentage</u>	<u>Selection</u>	<u>Price per sqf.</u> <u>U.S.Dollars</u>
2/6 sqf.	20/30/30/20	I/II/III/IV	135 cents
2/6 "	20/40/40	IV/V/VI	105 "
6/9 "	20/30/30/20	I/II/III/IV	125 "
6/9 "	20/40/40	IV/V/VI	100 "
6/12 "	20/30/30/20	I/II/III/IV	120 "
6/12 "	20/40/40	IV/V/VI	95 "
2/6 "	50/50	VII/VIII	70 "
6/12 "	50/50	VII/VIII	65 "

All above offers are C & F by sea any continental port and subject to final confirmation.

SIZE OF LEATHER SAMPLES FOR CUSTOMERS

Stickers on the flesh side of the
samples should indicate the type
of leather

SIZE OF LEATHER SAMPLES-SHADE & SAMPLE CARDS.	
G.I.C	Jrj
FACTORY DESIGN GROUP I	30-12-04
	09015

Reporting Item 12

The Effluent sedimentation pits have not been cleaned for the last 2 years and could not be cleaned during this visit.

Samples of chemicals have been available, but proper effluent tests could not be carried out.

1. Praestol 2515: as synthetic floccation product
2. Iron-or Aluminium Salt: for discolouration and reduction in the chemical oxygen demand (COD).
3. Lime: to add for pH adjustment, pH 8 - 9, where heavy metals are quantitatively precipitated.

For a simple process of effluent treatment for tanneries using chrome in the tanning process, see page 93.

Tanneries using vegetable or synthetic tanning agents use a slightly different treatment, see page 94.

A schematic flow diagram (physicochemical) for effluent treatment is also showing a well developed system which could be planned for the future, see page 95.

To improve the present Effluent situation:

1. The water in the "creek" is not flowing and is developing heavy smell, especially with the present tannery effluent. To remove the tannery effluent into the nearest flowing river, a pipeline to cover the distance of approximately 1 - 1.3 km along the creek would be one solution.
2. 2 heavy slatch cement-settling pits, size approximately 8 - 10 m² each with cages for easy removal/cleaning by chain lift should be built before the present settling pits.
3. 1 screw pump for removing slatch from the next 2 settling pits for removal and cleaning is required.
4. 1 old tanker lorry, to remove the slatch as mentioned under item 2, more often, like left sides of the pits using and the other side cleaning, is required.
5. To build a final floccation tank as per sketch on page 95 for final chemical treatment/floccation with pipe connection to return floccation settlement to the first settling pits.
6. 1 water pump to remove the water from the last overflow-settling pit to the floccation tank.

A simple process for treating chrome containing
waste waters from the leather and fur industry

Waste waters from all stages of processing and with different loading are first collected in an equalizing tank which has a minimum capacity of one day's production water requirement. This is to ensure adequate homogenization.

Waste water is removed from the reservoir batch-wise for subsequent chemical treatment with inorganic salts. The addition of iron or aluminium salts causes a thorough decoloration and a drastic reduction in the chemical oxygen demand (COD). The addition of lime produces best results within the pH range of 8-9, where any heavy metals are quantitatively precipitated.

Waste water processed as described above is treated en route to the sedimentation plant with a synthetic flocculant, Praestol^(R) 2515, which is thoroughly mixed with the waste water. The solids, present up to this point in the form of fine to very fine flocs, coalesce to form coarse agglomerates which settle out rapidly.

The waste water now leaving the sedimentation plant as overflow is clear, although it may occasionally have slight color. The remaining load resulting from chrome content is below 2 mg/l, while the COD value is below 50% compared to the waste water before treatment.

Following a repeat dosage with Praestol^(R), the resultant sludge can be dewatered using static or dynamic processes (filtration or centrifuging). The remaining sludge cake is ready for disposal.

It is important that the components necessary for chemical treatment are used in an aqueous solution. Inorganic salts such as FeCl_3 and $\text{Al}_2(\text{SO}_4)_3$ should be desolved at 10 and 20%. A 10% slurry is recommended for lime ($\text{Ca}(\text{OH})_2$), due to its poor dissolving properties.

Praestol^(R) 2515 produces optimum flocculation when applied as a 0.05 solution. The chemicals mentioned above therefore require separate dissolving and dosing units.

Reference figures on consumption (depending on particular loading of waste water):

Fe or Al salt:	500 - 1000 g/m ³
Lime:	500 - 1000 g/m ³
Praestol ^(R)	5 - 10 g/m ³

Clarification of a heavily loaded artificial
waste water containing vegetable tannins

Ingredients:

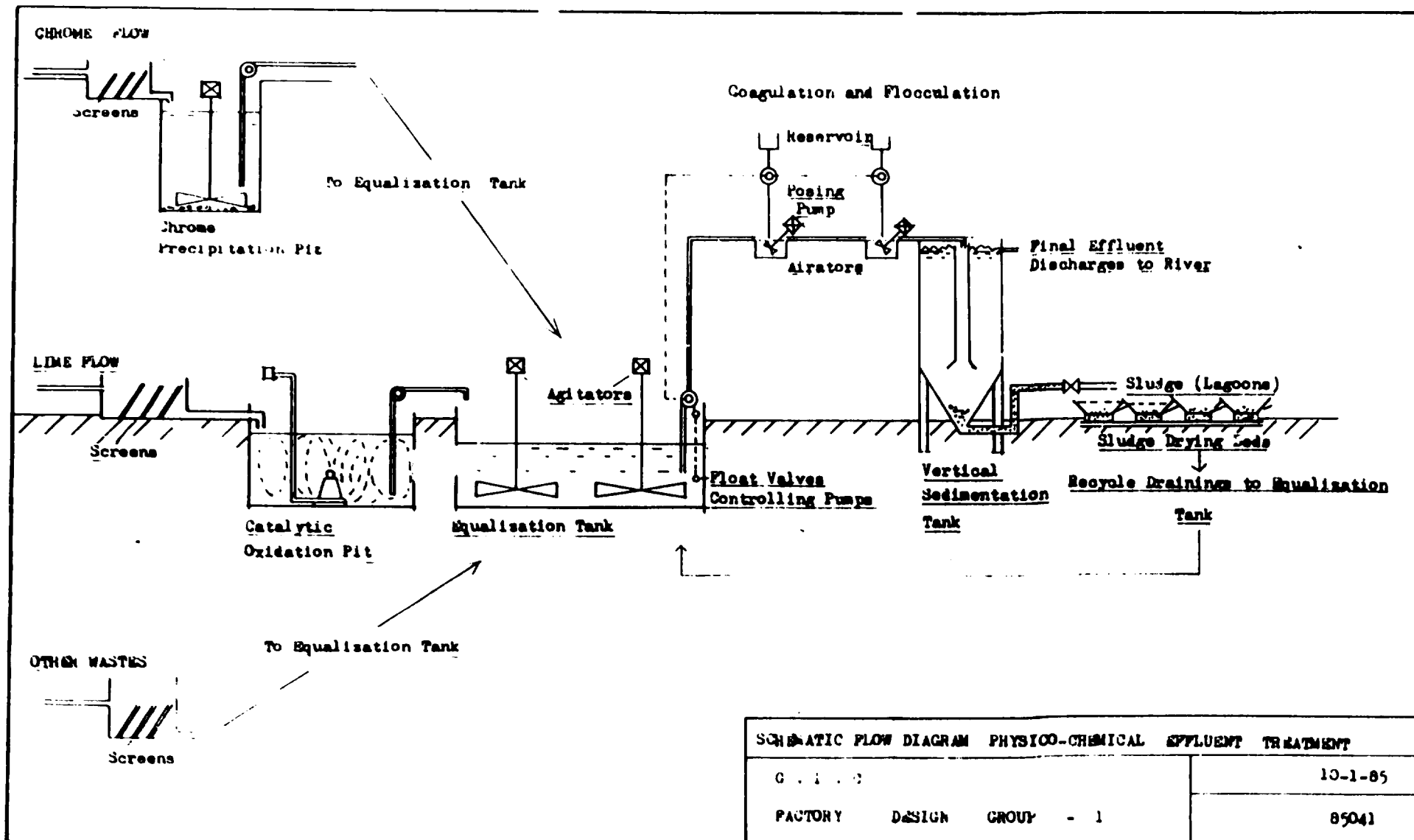
25 g/l mimosa
25 g/l quebracho
5 g/l tanigan QF

Procedure:

- dilute with tap water 1:1, use a 100 ml sample of this mixture; initial pH approx. 6.3
- add 5 ml aluminum sulfate (20% solution) equivalent to 10 kg/m^3 ; pH approx. 3.4
- add slurry of lime to achieve pH 8.2 approx.
- add 1 ml of 0.1% solution of Praestol^(R)2515, equivalent to 10 ppm of Praestol^(R).

Results:

good quality, bulky floc
high rate of sedimentation
no turbidity in treated water
practically no color, almost crystal clear.



SCHEMATIC FLOW DIAGRAM PHYSICO-CHEMICAL EFFLUENT TREATMENT	
G	10-1-85
FACTORY DESIGN GROUP - 1	85041

Reporting Item 13

The maintenance programme is perfect, but the implementation needs improvement.

1. The maintenance of all the scales should be included in the programme, regularly cleaning and checking to ensure correct weighing. Only complicated repairs should be carried out by the Suppliers.
2. Foreign engineers or fitters, while in Burma, should stay a few days longer to adjust and control the machines with training the maintenance persons and also the operators.
3. The fleshing and the 2 shaving machines, each must have one spare knife cylinder. There should be always one knife cylinder ready, replated, bearings checked for immediate change without any loss of time and production. Also these changes are normally planned on weekends.
4. The sammying/setting machine before the chrome splitting operation needs urgently 1 gear for the rubber roller drive, presetting before the sammying operation.
5. The tanning drums need main drive and sliding door chains as spares.
6. There is a shortage of many more important spares. In the tannery is only one machine each installed and required for the daily production. It would be vital to the production if there are no main spares for immediate repairs available.
Details of the required spares are mentioned in the attached list page 97 - 99.

Priority I - urgently required
Priority II - should be ordered
Priority III - should be in stock too

	<u>Priority:</u>		
	I	II	III
<u>A. Stainless steel drums D-28,D-10</u>			
1. Main drive chain	x	-	-
2. Stainless steel chain for doors	x	-	-
3. Electro-Pneumatic valve for sliding door system	x	-	-
4. Teflon axial seal	-	-	x
5. Steel ring for axial seal	-	-	x
6. Flap spring for ventilation	-	-	x
7. Change over valve block	x	-	-
8. Stainless steel valve with tap	x	-	-
9. Stainless steel valve with wheel	x	-	-
10. Door seal	-	-	x
11. Heat sensor at mixing unit	x	-	-
12. Push button for door opening-closing	-	x	-
13. Temperature gauge	x	-	-
<u>B. Fleshing Machine 2223</u>			
1. Spare fleshing cylinder with bearings	x	-	-
2. Bearings for fleshing cylinder	x	-	-
3. Pneumatic rubber booster roller	-	x	-
4. Tie rod for opening-closing mechanism	x	-	-
5. Photo cell for safety system	x	-	-
6. Main drive chains and sprockets	-	x	-
<u>C. Sammying Machine 2319</u>			
1. Felt sleeves	-	x	-
2. Pressure roller bearing bush	-	x	-
3. Gear for prestretching rubber roller drive	x	-	-
4. Double roller chain and sprockets	-	x	-
5. Main ball bearings for pressure rollers	-	x	-
6. Limit switch	-	x	-
7. Parts for foot switch	x	-	-
<u>D. Splitting machine 364 H</u>			
1. Rubber roller	x	-	-
2. Grip roller	x	-	-
3. Section roller	x	-	-
4. Pressure roller	x	-	-
5. Trueing and balancing stand of grinding discs	x	-	-
<u>E. Fleshing Machine 355</u>			
1. Spare blade cylinder with bearings	x	-	-
2. Bearings for blade cylinder	x	-	-
3. Reblading sets, incl. pneumatic hammer	x	-	-
4. Parts for foot switch (treadle switch)	-	x	-

	Priority :		
	I	II	III
<u>F. Setting Machine, 257,357A & 356</u>			
1. Felt sleeves	x	-	-
2. Parts for foot switch	-	-	x
<u>G. Shaving Machine 361-A</u>			
1. Spare blade cylinder incl. bearings	x	-	-
2. Bearings for blade cylinder	x	-	-
3. Trueing and balancing stand for grinding disc	x	-	-
4. Reblading sets	x	-	-
<u>H. Shaving Machine 354-H</u>			
1. Spare blade cylinder incl. bearings	x	-	-
2. Bearings for blade cylinder	x	-	-
3. Reblading sets	x	-	-
4. Trueing and balancing stand for grinding disc	x	-	-
5. Pressure roller	-	-	x
<u>I. Staking Machine 335-A</u>			
1. Main drive belt	x	-	-
<u>J. Automatic Spraying Machine</u>			
1. Spare product pneumatic feeding pump	x	-	-
2. Spare spray guns	x	-	-
<u>K. Hydraulic Press 2275</u>			
1. "Zug grain" embossing plate	x	-	-
2. Pressure control unit	-	-	x
3. Heater rod (electric)	x	-	-
<u>L. Rotary Ironing Machine</u>			
1. Heat sensor for glazing cylinder	x	-	-
2. Heat control unit	-	-	x
3. Heater rods (electric)	-	x	-
<u>M. Measuring Machine 331-A</u>			
1. Steel band	-	x	-
<u>N. Lifting Platform</u>			
1. Limit switch	-	x	-
2. Ventilation fan for motor	-	x	-

O. Dosemat Automatic Water PumpPriority :

1. Impellers
2. Mechanical seals
3. Pressure control switches
4. Electrical parts

I	II	III
x	-	-
x	-	-
-	x	-
-	x	-

P. Scale Balance

1. Base for dial head stand
2. Knife and bearings

x	-	-
-	x	-

Q. Steam Boiler

1. Boiler water feeding pump
2. Electrical parts for control unit

-	x	-
-	x	-

Reporting Item 14

The transport inside the factory needs immediate improvement. The manual handling should be stopped completely and a convertible transport system should be used. (see page 101 - 103) Only 1 strong bottom frame with wheels, on which platforms, horses or boxes can be placed by easy changing according to the requirements. Hides or skins will be placed on this transport -for easy moving from operation to operation. The machine operators will take the materials from the transport and place it again on the next transport, avoiding extra manual handling.

Cage cars should be placed underneath the drum to collect the material while discharging from chamber to chamber and enable moving to the piling or storing place immediately. Avoiding contact and damage by lime - chrome liquors while discharging. Also stopping the manual handling.

Reporting Item 15 - A

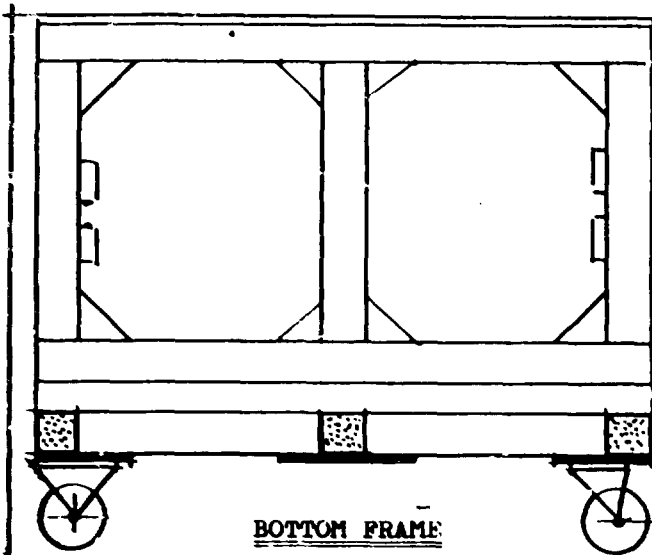
New technology process details are mentioned in Annex 2, page 2/1 - 4,

for the production of wet salted hides to shoe uppers, for the rapid tannage of sole leather in up to date process details.

For future trials, research and development, chemicals in small quantities should be ordered for approximately 300 - 500 kg of pelt weight hide or skin material.

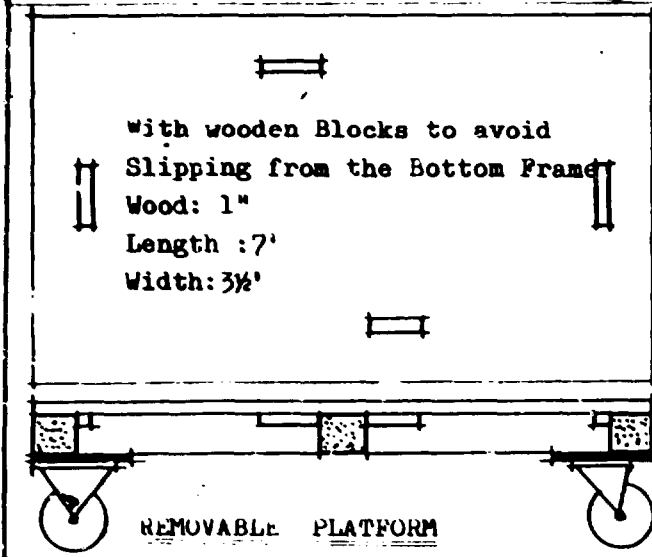
Main Chemical Suppliers are:

BASF	West Germany	
Bayer	"	"
Hoechst	"	"
Henkel	"	"
Roehm GmbH	"	" Kirschenallee 6100 Darmstadt



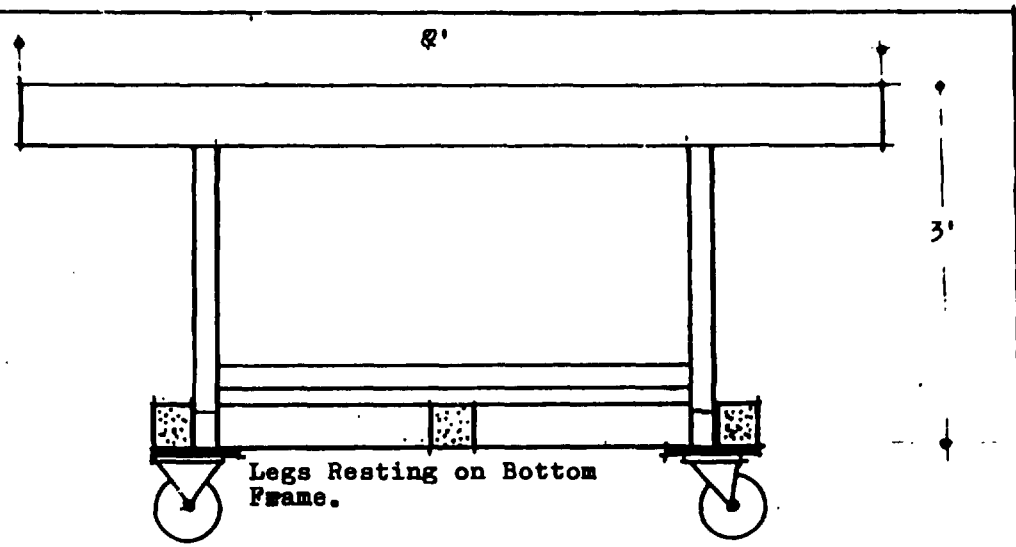
Wood: 4"x4"
 Length: 5'
 Width: 3'
 Wheels: 8-10"
 All Movable
 around, With
 Hard Rubber
 Lining.

BOTTOM FRAME



With wooden Blocks to avoid
 Slipping from the Bottom Frame
 Wood: 1"
 Length : 7'
 Width: 3½'

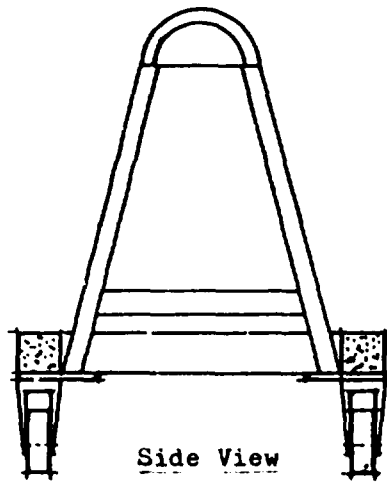
REMOVABLE PLATFORM



Legs Resting on Bottom
 Frame.

REMOVABLE HORSES

Wood Legs: 2½"-2¾"
 Length on top: 7'
 High: 3'

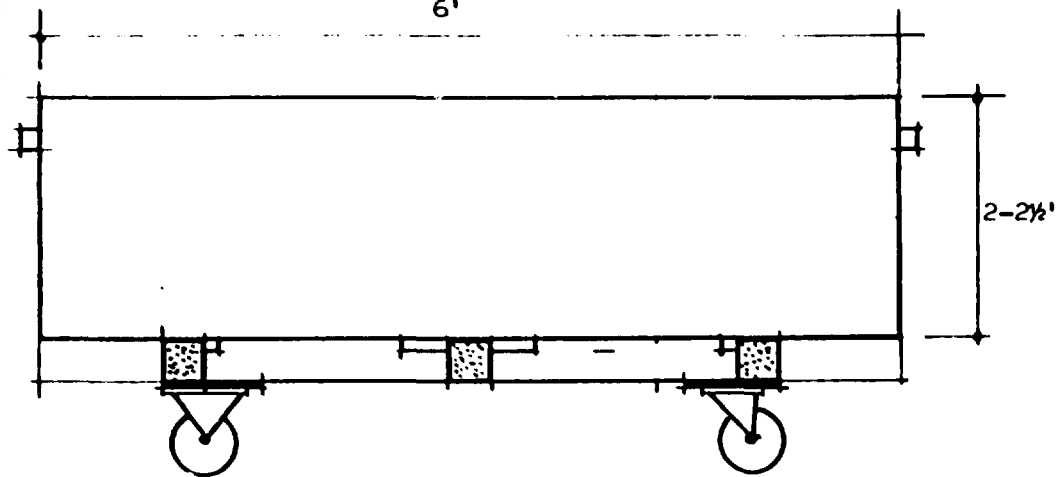


Side View

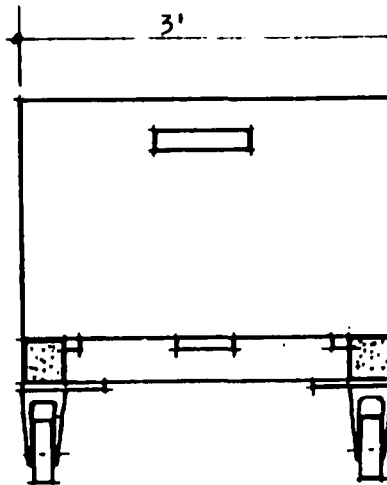
TRANSPORT: CONVERTABLE TYPE		
G.I.C	G.I.C	1-1-85
FACTORY DESIGN GROUP-I		85018

REMOVABLE BOXES

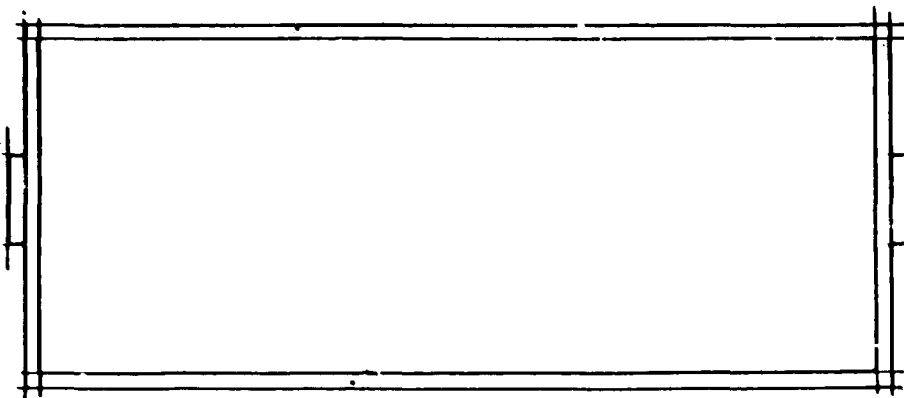
6'



Side View



Front View



Top View

REMOVABLE BOXES

Same as Platform, only as boxes, resting on Bottom Frame:

Length : 6'

High : 2-2 1/4'

Width : 3'

With Outside Handle For Pulling or Lifting.

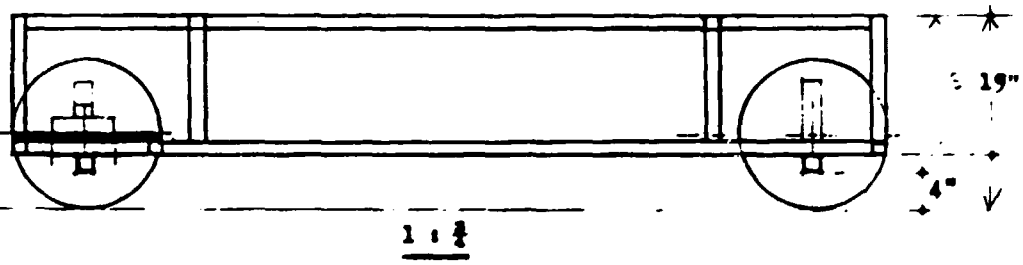
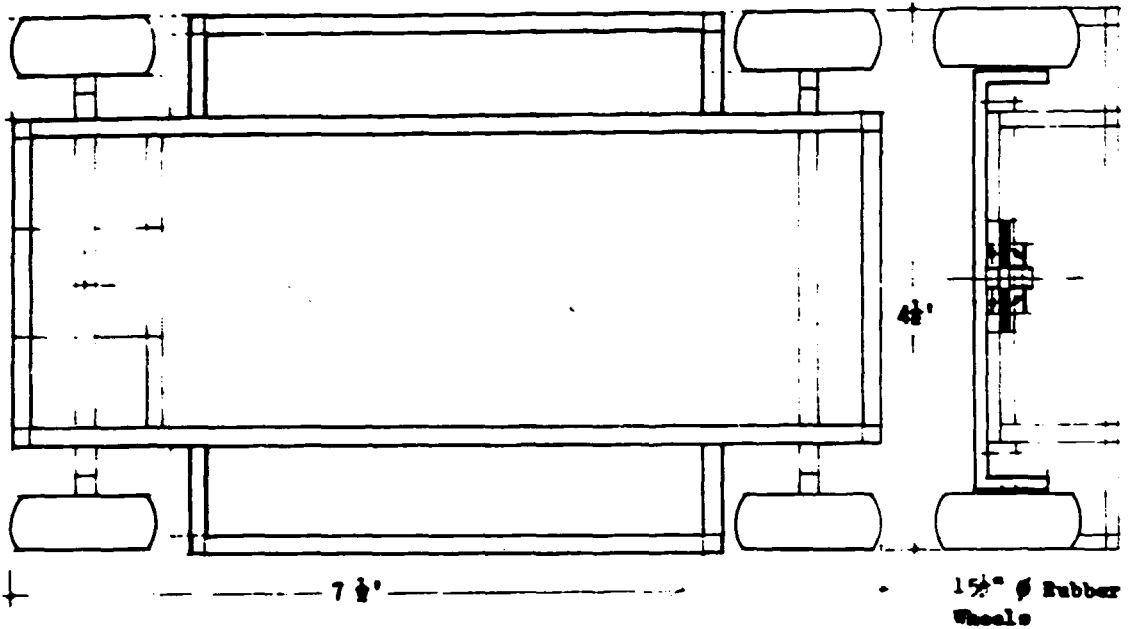
Transport: Convertable type

G.I.C

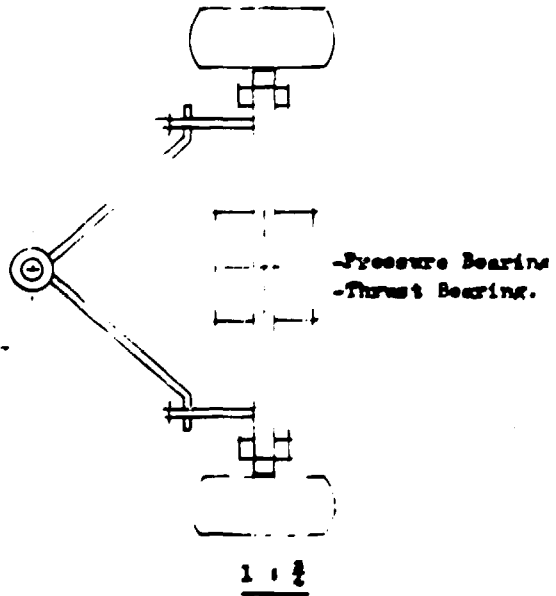
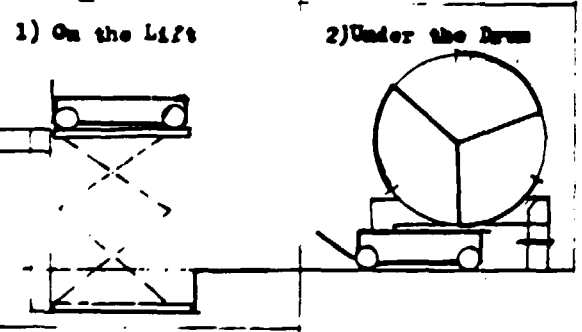
1-1-35

FACTORY DESIGN GROUP-I

85019



2"X2"X1/2" - 2 Nos.
Welding Joint.



Horse Shoes



TRANSPORTATION FOR LOADING AND UNLOADING FOR S. DRUM	
O. I. C.	27 - 12 - 64
FACTORY DESIGN GROUP I	67014

Reporting Item 16

1. The Seminar attended by 21 technicians and foremen from the:

LF(R)1
 LF(R)2
 LF(M)
 LGF(R)
 PFF(I)

has been very interesting and useful. Similar seminars should be organized again for special subjects.

2. Improvement in preserving and flaying the raw hides and skins is needed all over the country, - as next subject.

Training and information of responsible persons from all the 141 raw hide/skin collecting places is very important. Also the present problem, how to get low price salt for immediate preservation to the countryside, must be solved.

The improvement of flaying, to avoid holes and deep butcher cuts can easily be solved by higher prices for good flaying and lower prices according to the damages.

Reporting Item 17

1. Slaughter House Rangoon

At the local climate, 30 - 43°C and humidity of 40 - 96%, immediate salt preservation must be carried out. The Lorry from the tannery should be covered and protected by plastic foil, sufficient salt must be taken. Already approximately 15 minutes after the flaying, the salt preservation can be started on the lorry. Arrangements for a preservation place very near to the slaughter house, instead on the lorry, would be even better.

2. Rangoon Leather Factory No.2

This factory is expanding and should adopt the new modern process, the "Rapid tannage of sole leather" in the new part of the factory. The tanning process time can be reduced from 8 weeks to approximately 6 - 8 days. Also skins should be produced in a similar short time process without the heavy smell from pits and layers.

The chrome tanned splits being used for industrial gloves are now of better quality after "full chrome tanning" is carried out at LF(R)1.

3. Leather Goods Factory, Rangoon

The improved leather quality from the LF(R)1 will help to produce more and better quality leather goods items, especially waist-beltings, leather balls, shoes, handbags, etc. as mentioned already under "Marketing".

4. Rangoon Institute of Technology

- no Recommendations - Useful until LF(R)1 got all the equipment to do the physical and analytical tests in the tanneries laboratory.

5. People's Footwear Factory, Indaing

With the new leather quality, the quality of the shoes is very much improved. Before, 6 month wearing time had been counted, now 9 - 12 month or even more should be calculated.

Also the "full sock" insole should be replaced by vegetable tanned sheep-skin material, but as full piece insole, glued to the first leatherboard insole.

Shoes from the old and new leather production have been available for demonstration. The quality from the new production is showing a great improvement not only in the appearance, but also regarding comfort, health and long wearing.

6. Leather Factory Mandalay

The new factory is still under construction by a Czechoslovakian team of experts. The production is expected to commence approximately in June/July 1985.

The production Manager from the above mentioned team attended the Seminar at LF(R)1. The full co-operation regarding technology, chemicals, development and research has been offered to him for which he did show very much interest and approval. There are no further recommendations at the present construction stage.

7. Central Research Organisation

- no recommendations - Useful until LF(R)1 got all the equipment to do the physical and analytical tests in the tanneries laboratory.

8. Reporting Item 18

For chrome tanning, ready made chrome crystals under different trade names are available. The standard products contain 26% Cr_2O_3 and are of 33% basicity. Also there are self-basifying products offered with different concentrations. All of these products are import items. If any tannery is running short of the chrome tanning agents, chrome tanning liquors can be produced in any tannery.

The 6⁺ Sodiumbichromate can be reduced to the 3⁺ chrome tanning liquor easily in self-reduction.

To carry out this self-reduction in an economical way and with some laboratory control, the following working method is advisable (see page 106). The proper calculation and the storing time for oleation is very important, because it must be known how much of the produced liquor should be used, offering 2% Cr₂O₃ calculated on the pelt-weight, in the chrome tanning. The method mentioned has been used very successfully for many years, saving time, sulphuric acid and sodium bicarbonate.

For the self reduction, the following containers can be used, also if possible with a chimney to remove the acid fumes. (see page 107).

Production of Self-Reduced Chrome Liquors

from Sodiumbichromate (50% Cr₂O₃) (in lbs. or kg)

Basicity of liquor:	33%	38%	45%
Water	336	336	336
Na ₂ Cr ₂ O ₇	336	336	336
H ₂ SO ₄ conc. 66° Bè	346	326	291
Chrome shavings, dry	50	50	50
Sodium Thiosulphate (Hypo)	10	10	21)
Brown sugar from sugarcane (dissolved) add slowly	46	43	60)

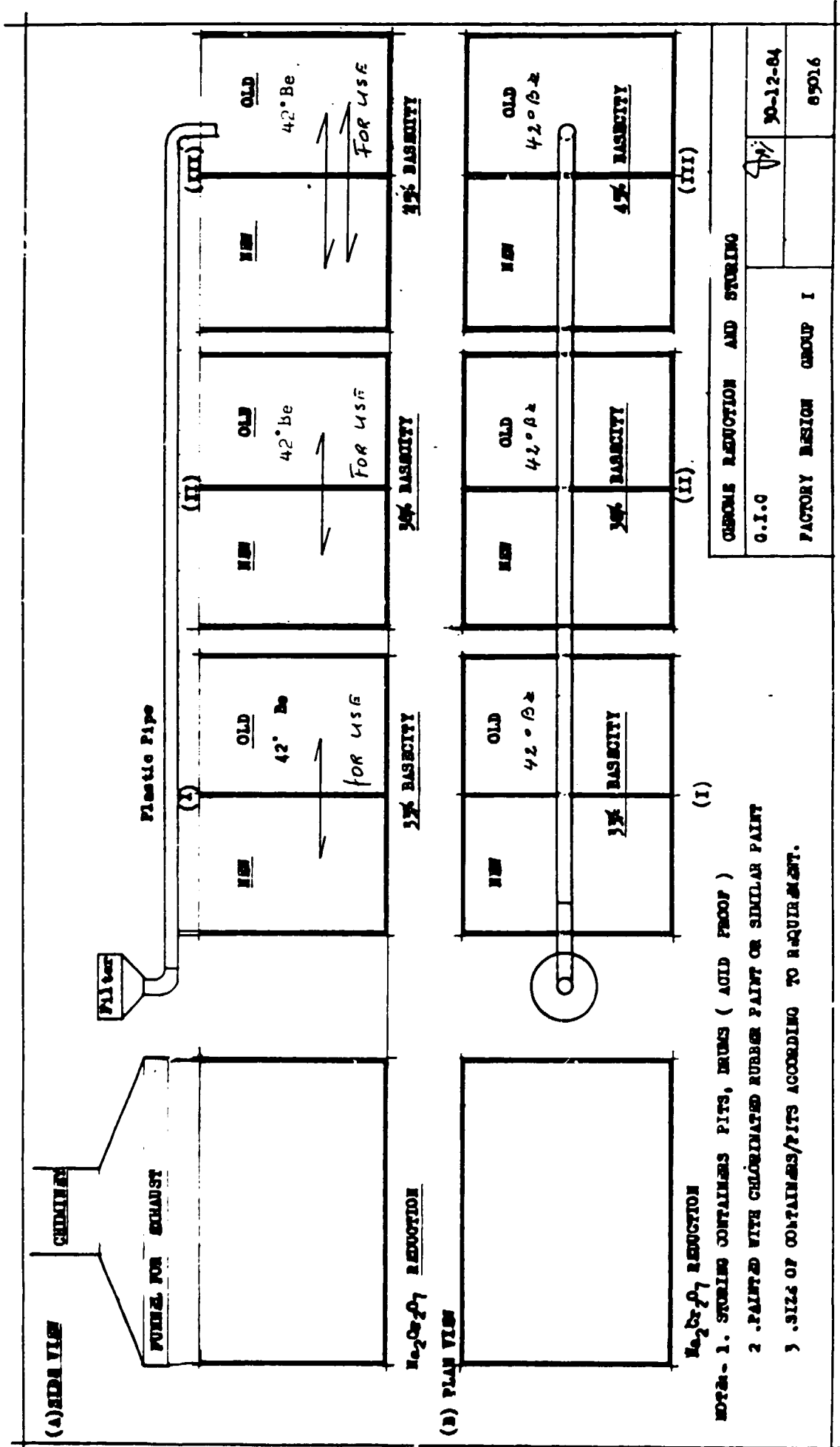
Check up on white paper if the reduction is completed. If completed, cool down overnight, filter through cotton waste or jute bags into the storing pits, dilute to 40° Bè. If more concentrated liquors are required, less water should be used. The same calculation can be done with liquors of 42 - 45° Bè.

Calculation of Cr₂O₃ content:

336 lbs. Na₂Cr₂O₇ (50% Cr₂O₃) contain = 168 lbs Cr₂O₃
 add water to make up to 40° Bè = 525 litre
 168 lbs Cr₂O₃ in 525 litre: = 0.32 lbs Cr₂O₃ in
1 litre of 40° Bè

Remarks:

Before using the liquor, store for a few days or as long as possible for oleation.
 If chrome shaving are being used, the liquor must be filtered.
 As Sodium Bichromate is very hygroscopic, the weight must be taken immediately after opening of the drum.



Reporting Item 19

Many experiments and trials have been carried out on hides and skins and some chemicals. For details see Annex 3/1 - 52. The main Items are:

1. Raw hide/skins, soaking to liming, reliming
2. Deliming, bating, pickle and chrome tanning
3. Special reliming and bating for goat skins
4. Further processing of old wet blue stocks
5. To find a suitable permanent neutralizing chemical, tests with several products
6. Prefatliquoring with different products available
7. Retanning with different products available
8. Dyeing with 0.5% dye instead of 1%
9. Final fatliquor combinations which do not precipitate on the leather surface, with products available
10. Football leather, from liming to finishing
11. Garment suede from goat skins
12. Garment Nappa from sheep and goat skins
13. Chevreaux shoe uppers from goat skins
14. Waist-Belt leather, retannage
15. Boxing gloves
16. Shoe suede from goat skins
17. Fur skins, soaking to fatliquoring
18. Surface and penetration dyeing
19. Degreasing of sheep skins after chrome tanning
20. Using HCL in pickle instead of Sulphuric acid for leather with high tensile strength
21. Retanning without float
22. Fixation of chrome in tanning, pH and temperature for maximum fixation
23. To copy white-violet leather from customers
24. Finishing with different pigment: binder ratio
25. Stretchless football leather. Designed stretching frame and already put into operation
26. Stretchless waist beltings, using similar frame
27. Polishing of goat skins on the buffing machine

Also Chemicals have been tested for:

1. Emulsifying capacity of fatliquors to different oil products
2. Tanning action of synthetic tanning agents
3. Stability of fatliquor combinations
4. Self reduction of Sodiumbichromate, 3 different basicities
5. Neutralizing action of different products

Pre-trials in the tanneries laboratory are necessary to test the chemicals and combinations before using them in the bulk production. No product should be used in the bulk production without pre-testing and approval by the laboratory. This refers also to products which are used as substitute, if the main products are not available.

Reporting Item 20

The "Main Chemical Parameter" has been established, mentioning the chemicals according to priority:

Priority I : Products which are always required for the standardised process to produce a standard leather quality.

Priority II : Products which are required for other types of leather.

Priority III : Products which are required for experiments - development - research.

At present, not many chemicals are available to make suitable adjustments. Some main chemicals are out of stock.

High cost chemicals should not be used for low quality leathers.

The chemical counter offers in Tender Notices are never the same as the products mentioned. Low price products very often have to be used with increased quantity where finally the price advantage is getting to be a disadvantage.

LF(R)1 and LF(M) are co-operating in using the same or similar technology for which the main products are the same. This will ease the chemical purchasing and reduce the number of products considerably.

Stock keeping should be improved, to calculate approximately 2 - 3 month's buffer stocks. The new established lot-cards will help to show the daily-weekly - monthly exact chemical consumption figures for future planning, to avoid shortage of products and loss of production.

Too many changes of products should be avoided as the persons responsible have not sufficient knowledge and experience to replace new products into the standardised process.

Customers who order according to the samples they have received, expect that the bulk supply is of the same quality. This must be very strictly respected otherwise claims may be expected.

Planning of Chemicals: Stock Keeping

There should be co-operation between the Production Manager and the planning department regarding stock keeping of the chemicals.

At least once per month the Production Manager should check the chemicals he got in stock, calculating his monthly approximate consumption to know exactly when chemicals have to be ordered again in time.

Normally, 2 - 3 month are needed from the date of the order till the date of the arrival of goods.

Additional 2 - 3 month should be calculated for buffer stocks in case there are delays in supplies.

The recommended table for all the chemicals should be established to have full control on the chemical stocks, consumption, chemicals in transit and timing for new orders, to avoid any shortage. (see page 111)

MINERAL PLANNING, (EXAMPLE)

1. LIME YARD

ITEM	NAME	STOCKS 1.3.85 KG	PRESENT MONTHLY CONSUMPT KG	DANNERY NO 12.4	← 1 9 8 5 →											
					MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.		
1	HYDRATED LIME POWDER	18000	1. 5000	8000	8000	2000										
			2. 2000													
			4. 1000													
			TOTAL 8000													
2	NA ₂ S FLAKES LIQUIL	20000	1. 4000	5800	5800	5800	2600									
			2. 1000													
			4. 800													
			TOTAL 5800													
3	NAHS	11000	1. 1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	600			
			2. -													
			4. -													
			TOTAL 1300													

REMARKS: NEW ORDERS, DATE:
QUANTITY:

ARRIVAL DATE :
QUANTITY:

Reporting Item 211. Trimming after Green-Fleshing

Responsible persons should be trained to do a proper job, trimming all the parts from hides and skins which are not suitable for the production of leather, saving chemicals and extra costing.

2. Trimming after Ex-Chrome Splitting

The splitting machine operators should take more care, to avoid double foldings while feeding the machine, reducing the damage to a minimum. There should be nearly no trimming after splitting. Also hides, which are too large for this machine, should be cut into sides before the operation.

3. Trimming after Shaving

Shaving machine operators should take more care, to avoid feeding double foldings into the machine which are definitely cut down and get damaged.

The trimming persons should stop the "easy trimming", rounding the sides or full hides. Only corner trimming should be allowed.

4. Damages on the Vacuum Dryer

The still wet leather should be well set out on the hot plates by hand-slickers to remove all the wrinkles and foldings before closing the machine. Very little trimming will be necessary.

5. Trimming after Toggling

should be minimised. Toggles must be placed in such a way that the leathers are flat and level.

Finally

The loss of measurement, estimated to approximately 3.5 - 4 sqf. per hide has been already reduced considerably to approximately 1 - 1.5 sqf. during this mission.

The factory is calculating 16 sqf. as average for the light - medium and some heavy hides. This average figure should be easily increased to 18 sqf. which will bring additional measurement:

100,000 cow hides, 18 sqf. avg. = 1800000 sqf.
100,000 cow hides, 16 sqf. avg. = 1600000 sqf.

Measurement increase by: 200000 sqf.

The persons responsible for process control should take very strict action.

Reporting Item 22

The present production capacity for finished leather can be increased by working overtime or can even be doubled from 550 sides per day shift to 1000 - 1100 sides working in 2 shifts, if necessary.

The rated or actual production capacity has been reported earlier.

For immediate quality improvement, especially for export items in crust or finished condition,

1 vibration staking machine "Molissa type" for hides
 1 horizontal staking machine "Schoedel type" for skins
 would be required.

For the production of fine shoe upper leathers from goat skins, "Chevreaux type", with plating finish,

1 stone pol-ishing wheel (a simple machine)
 would be required.

Water Situation:

3 tubewells with 6" diameter pipe are supplying water to the tannery, pumping 14 hours per day.

3 storing tanks of 15,000 gallons are in use. This water supply is sufficient for the tannery only.

Since the existence of the next door Leather Board Factory. Large amounts of water are supplied daily to this factory, causing water shortage at the tannery which means loss of production.

Temporary measures, to build a cooling tower to recycle the water from the 2 vacuum drying machines. Using wood-wool inside some wire mesh frames, placed above the collecting water tank. Still there is one old 2" pipe tubewell which needs only connection to the surface tank.

Permanent measures, to get 2 new tubewells of 8" diameter and 2 more overhead tanks to guaranty the water supply for both factories allround the year.

Reporting Item 23

A new factory layout plan, extension and flow chart have been prepared with many improvements for future planning. Especially separating the soaking-limeyard from the tanning-retanning section. The production capacity could be nearly double.

1. For such an extension, additional equipment-machines would be required like:

1. 3 stainless steel or 6 wooden drums for soaking-liming-reliming, total maximum load approximately 36 tons
2. 1 Fleshing machine, ex lime
3. 1 Splitting machine, ex lime
4. 1 Shaving machine, 175 cm working width
5. 1 Vacuum dryer, 2 plates 400 x 220 cm

2. Possible Production:

90,000 hides for wet blue for export per annum
80 -90,000 hides for crust or finished leather per annum
170-180,000 hides total per annum
300,000 skins total per annum for wet blue, crust or finished
 =====

Production figures: (20 working days/month)	<u>pieces per day</u>	<u>pieces per month</u>
Cow hides, wet blue export	375	7500
Cow hides, for crust-finishing	<u>354</u>	<u>7083</u>
	729	14,583
Skins for wet blue/crust and finishing	1,250	25,000
		=====

3. Remarks:

1. It is very important to separate the liming section from the tanning-retanning section.
2. For the new factory layout plan, see Annex 13, page 13/1 - 7. including also paddle construction and drum specifications.
3. The production of heavy Buffalo hides is only suitable after splitting ex lime is possible.
4. With some additional investment, which is very low in comparison with the factory renovation, nearly double the production is possible.

Reporting Item 24

1. The preservation of raw hides and skins and also the flaying needs country wide improvement. Low cost salt should be available for all the 141 collecting places. The raw hides and skins are of very high national value which must be preserved in the best possible way.
2. The LF(R)1 must work fully and with up to date technology as factory and get away from practising cottage industry methods. Co-operation between LF(R)1 and LF(M) is very important.
3. Very strict process and leather quality control is important. Very soon the LF(R)1 will be able to carry out all the physical and analytical tests required.
4. The production process should be standardised for various types of leather. Any changes in the process, by use of different chemicals etc. need approval by the laboratory after running necessary pre-trials. Too many changes of chemical products should be avoided.
5. Improved selection, already from the beginning of the process, should decide for which type of leather the hides/skins are suitable.
6. Chemicals and machine spare parts should be always available to avoid loss of production.
7. Selection and grading, by a team of selectors, for export items should be fully in line with the customers specification and the international standards.
8. Marketing of more leather items. Priority should be given for items which can be sold at the highest possible price, increasing foreign exchange earnings.
9. Training of operators for better utilization and efficiency, avoiding damages.
10. Training of technicians from the "young generation" outside Burma should be started as soon as possible. A full training needs approximately 4-5 years.
11. The "Follow up" of this visit and the recommendations is very important.

- END OF RECOMMENDATIONS -

ANNEX 1CONTENTSItem

1. Goat/Sheep : Soaking - chrome tanning
2. Cow : Soaking - chrome tanning
3. Cow : Retanning for slipper
upper leather
4. Cow : Beige colour for crust
export
5. Cow : Natural colour for crust
export
6. Cow : Football leather, soaking
till chrome tanning
7. Sheep : Retanning wet blue skins
for shuttle cock leather
8. Cow/Buffalo: Retanning for Army shoes
9. Goat/Sheep : Retanning for lining leather
10. Cow/Ox : Retanning for Upholstery-
leather
11. Buffalo : Retanning for Waist-Belt-
leather
12. Goat : Retanning for shrunken grain
13. Goat/Sheep : Retanning for Glove leather
14. : Recipe for Finishing

ITEM 1 :

FINDING

PROCESSING OF GOAT/SHEEP SKINS FOR WET BLUE

QUANTITY : 1633 pcs., 3000 Kg.

DATE : 2.11.1984

DRUM NO. : D 10 (3)

LOT NO. : 278

PAGE : 1

TIME	%	PRODUCTS	REMARKS
30'	150	Water at 28°C	End pH 7 Speed : 2
10'		Drain	Speed : 2
	100	Water at 28°C	Speed : 1
	0.2	Sodium sulphide (liq) 25°Be'	
	0.2	Amellan	
16 hrs.	0.03	Garuda K	Start pH 10+ End pH 8
		Time switch pos: 3, $t_1 = 10'$, $t_3 = 10'$ $t_4 = 30'$	
10'		Drain	
	60	Water at 28°C	Speed : 1
	0.5	Mollescal PA	
	2.0	Hydrated lime	
60'	2.0	Sodium sulphide (liq) 25°Be'	
	2.0	Hydrated lime	
3.11.84	4.0	Sodium sulphide (liq)	Start pH : 11+
24 hrs.		Add: Lime 30 Kg & Na ₂ S (liq) 60 Kg	End pH : 11+
at: 7:00 a.m.		Time switch pos 3, $t_1 = 10'$, $t_3 = 10'$ $t_4 = 30'$	

ITEM 1 - Page 1 (continued)

TIME	%	PRODUCTS	REMARKS
10'		Drain	
	100	Water at 28°C	Speed : 1
8 hrs.	1.0	Hydrated line	
		Time switch pos: 3, $t_1 = 10'$, $t_2 = 10'$, $t_3 = 30'$	
5.11.84			
10'		Drain	
20'	100	Water at 28°C	Speed : 2
10'		Drain	
20'	100	Water at 28°C	
10'		Drain	
20'	100	Water at 28°C	
		Drain float and discharge chamber after chamber for fleshing, trim properly, weighing.	
		Felt weight : 2400 kg. *****	

PROCESSING OF GOAT/SHEEP SKINS FOR WET BLUE

FINDING

QUANTITY : 1633 pcs., 2400 kg.

DATE : 5.11.1984

DRUM No. : D 10 (3)

LOT NO. : 278

PAGE : 2

Percentage on Pelt Weight

TIME	%	PRODUCTS	REMARKS
20'	100	Water at 28°C	Speed : 2
10'		Drain	
30'	100	Water at 28°C	
10'		Drain	
	30	Water at 28°C	Speed : 2
	1.0	Decalcal N powder	
	0.5	Ammonium sulphate	
	0.5	Sodium bisulphite	
90'	0.4	Amalan S	Start pH : 6.5 End pH : 9
		ADD :	
	20	Water at 28°C	
120'	1.0	Orepon OR	Start pH : 9 End pH : 9
10'		Drain	
20'	100	Water at 28°C	
10'		Drain	
20'	100	Water at 28°C	

Percentage on Pelt Weight

Page 2 (continued)

TIME	%	PRODUCTS	REMARKS
10'		Drain	
20'	100	Water at 28°C	
10'		Drain	
	40	Water at 28°C	Density : 80'
30'	6.0	Salt	67 - 8
		ADD :	
	0.4	Formic acid (Dil. 1 : 5)	
120'	0.5	Sulphuric acid (Dil. 1 : 10)	Start pH : 1 ⁺ End pH : 3 ⁺
180'	15.0	Chrome liquor	
		ADD :	
	40	Water at 28°C	Speed : 2
60'	0.5	Imperial DC	Start pH : 5 ⁺ End pH : 4 ⁺
	0.5	Sodium bicarbonate	
	0.5	Sodium carbonate	End time : 31°C
120'	0.05	Garnia K	End time : 8.00 a.m.

ITEM 2 :

FINDING

PROCESSING OF CATTLE HIDES FOR WET BLUE

QUANTITY : 297 pcs., 3000 kg.

DATE : 12.11.1984

DEHM NO. : D 10 (3)

LOT NO. : 588

PAGE : 1

TIME	%	PRODUCTS	REMARKS
20'	100	Water at 28°C	Speed : 2
10'		Drain	End pH : 7
	100	Water at 28°C	Speed : 1
	0.2	Asollan S	
	0.2	Sodium sulphide (liq) 25°Be'	
16 hrs.	0.03	Garcin K	Start : pH 10 ⁺ End : pH 8 ⁺
		Time switch pps. 3, $t_1 = 10'$ $t_2 = 10'$ $t_3 = 10'$ $t_4 = 30'$	
		Drain not completely discharge chamber after chamber for fleshing, trim properly, weighing.	
13.11.84		Green-fleshed weight : 2600 kg -----	
20'	100	Water at 28°C	Speed : 2
10'		Drain	
	60	Water at 28°C	Speed : 1
	2.0	Hydrated lime	

Item 2 - Page 1 (continued)

TIME	%	PRODUCTS	REMARKS
60'	2.0	Sodium sulphide (liq)	
	2.0	Hydrated lime	
16 hrs.	2.0	Sodium sulphide (liq)	Start : pH 11 End : pH 11
		Time switch pos. 3, $t_1 = 10'$, $t_2 = 10'$, $t_3 = 30'$	
10'		Drain	
	100	Water at 28°C	Speed : 1
8 hrs.	1.0	Hydrated lime	
		Time switch pos. 3, $t_1 = 10'$, $t_2 = 10'$, $t_3 = 30'$	
10'		Drain	
20'	100	Water at 28°C	Speed : 2
10'		Drain	
20'	100	Water at 28°C	
10'		Drain	
20'	100	Water at 28°C	
10'		Drain	

Item 2 :

PROCESSING OF CATTLE HIDES FOR WEST BLUE

FINDING

QUANTITY : 297 nos., 2600 kg.

DATE : 15.11.1984

DEEM No. : D 10 (3)

LOT No. : 588

PAGE : 2

Percentage on Green Fleeced Weight

TIME	%	PRODUCTS	REMARKS
	40	Water at 28°C	Speed : 2
	2.0	Ammonium sulphate	
120'	0.5	NaOH 8	Start : pH 6 End : pH 8.0
		Cut with phenolphthalein :	Colourless
10'		Drain	
	30	Water at 28°C	
120'	0.5	Oregon OR	Start pH : 8.0 End pH : 8.5
		Cut with phenolphthalein :	Colourless
10'		Drain	
20'	100	Water at 28°C	
10'		Drain	
20'	100	Water at 28°C	
10'		Drain	
20'	100	Water at 28°C	
10'		Drain	
	40	Water at 28°C	

Item 2, Page 2 (continued)

TIME	%	PRODUCTS	REMARKS
30'	8.0	Salt	Density
20'	0.5	Calciumformate	No' 7-8
120'	2.0	Sulphuric (Dil. 1:10)	Start pH : 1 End pH : 3
6 hrs.	20.0	Chrome liquor	
		ADD :	
	40	Water at 28°C	
	0.9	Neutrigun P ₄ (cr)	
		Sodium carbonate	
120'	0.05	Germin K	

Start pH: 4 End pH : 3.5 End temp. 32.7°C

End time : 7:30 a.m. End Date : 16.11.84

ADD : 0.2% S/A at 10:00 a.m. (15.11.84)

ITEM 3 :

PROCESSING OF CATTLE HIDES FOR SLIPPER UPPER LEATHER

FINDING

QUANTITY : 85 sides, 70 kg

DATE : 21.11.1984

DESM No. : S 2.5

RETANNING

TIME	%	PRODUCTS	REMARKS
20'	100	Water at 28°C	18 BFN
10'		Drain	
	100	Water at 28°C	
	1.0	Calciumformate	
30'	1.2	Sodiumbicarbonate	End pH : 6
20'	150	Water at 28°C	
10'		Drain	
	100	Water at 28°C	
	2.0	Palltax 23D	
45'	2.0	Bye bark extract (or) Micon extract	
		ADD :	
30'	0.5	Nigrosine crystal	
		ADD :	
	4.0	Oliner 77	
	0.5	Pallan S	
45'	0.5	Olinal ML	
20'	0.2	Formic Acid (Dil. 1:5)	
10'	0.5	Lipomix liquor NO	
10'	0.01	Garmin K	
		End pH 4*	
		Cut pH 5.5	
		End temp 30°C	
		End time 7:45 a.m.	
		End date 23.11.84	

ITEM 4 :

FIDING

PROCESSING OF CATTLE HIDES FOR EXPORT CRUST

BRIDGE COLOUR

RETANNING

TIME	%	PRODUCTS	REMARKS
20'	100	Water at 35°C	
10'		Drain	
	60	Water at 35°C	
10'	1.0	Lipodern liquor IC	
60'	4.0	Chromocal B. powder	
15'	2.0	Basyntan Supra BLE	
20'	3.0	Maluga BE (1:5)	
30'	3.0	Basyntan BLE	
30'	1.0	Noutrigan P4	
30'	1.0	Calcium Formate	
		B.C.G. Test	
		pH = 5.5	
10'		Drain	
30'	150	Water at 35°C	
10'		Drain	
30'	150	Water at 35°C	
10'		Drain	
	100	Water at 35°C	
	6.0	Lipodern liquor IC	
	2.0	Lipodern liquor SK	
60'	4.0	Lipernin liquor NO	
		ADD	
20'	0.5	Formic Acid	
20'	0.01	Garmin K	
10'		Drain	
20'	100	Water at 28°C	
10'		Drain	
		Soak up overnight, set out, hang dry, condition overnight, staking, toggle, trimming.	

ITEM 5 :

PROCESSING OF CATTLE HIDES FOR CRUST LEATHER

FINDING

DATE : 12.12.84

(Natural Crust)
Retanning

TIME	%	PRODUCTS	REMARKS
20'	200	Water at 28°C	
10'		Drain	
	100	Water at 28°C	
	1.0	Calcium Formate	
30'	1.2	Sodium Bicarbonate	
		End pH =	
10'		Drain	
20'	200	Water at 28°C	
10'		Drain	
	100	Water at 28°C	
45'	2.0	Pallutax 2ND	
		ADD :	
	4.0	Sulphonated oil	
	0.5	Pallum S	
45'	0.5	Lipodern liquor SK	
		ADD :	
20'	0.2	Formic Acid (dil. 1:5)	
		ADD :	
20'	0.5	Lipodern liquor NO	
10'	0.01	Garmin K	

BEANHOUSE OPERATION OF FOOTBALL LEATHER

Soaking

200%	water	in pit
0.3 gm/li.	Cinnollan BH	
		leave overnight

Lime - painting

10%	lime powder	) 35 Be'
5%	sodium sulphide (liq)	
	water (suitable in mix with paste))	
		leave overnight

Re-liming

200%	water	
5%	lime powder	in pit
		leave for 4 days
		handle thoroughly twice each day

De-liming

	70%	water	
45'	2.5%	Ammonium sulphate	
30'	0.5%	Oxypon OR	float
			pH check (8 - 8.4)
			lime must be freed
			washing 15'

Pickling

	80%	water	
10'	8%	salt	
10'	0.5%	Calcium Formate	
1 hr 40'	1.25%	Sulphuric Acid	
			leave overnight

Tanning

6 hrs -	7.0% +	Chrome powder (as powder)	
2 hrs -	0.5% +	Sodium Bicarbonate	
			float
			(pH check 3.5 - 3.8)

Item 6 (continued)

FINDINGREPAIRAGE OF FOOTBALL LEATHER

(For Glue Sticking)

Washing 10' 200% water Thickness 1.6 - 1.8 m.m.

Neutralisation

	100%	water	
30'	2%	Baryton FC	
	1%	Calcium Formate	
30'	0.7%	Sodium Bicarbonate	pH check 4.6
	2%	Minox	
45'	2%	Baryton DLK	
			Drain
10'	150%	water at 60°C	
			Drain

Dye + Fatliquoring

	100%	water at 60°C	
30'	0.5%	Nigrosine	
	4.0%	Gliser 77	
30'	1.0%	Gliser NL	
60'	1.5%	Chrome powder	
20'	0.5%	Formic Acid	
20'	0.5%	Lipamin liq. NO	
			pH check 3.8
			Drain : wash horse up
			Set out, hanging dry
			condition, staking,
			toggle.

ITEM 7

FIDINGRetannage of sheep skins
for shuttle-cock leather

Thickness 0.5 m.m.

Washing

20' 150% water

Neutralisation

100% water

4.0% Chrome powder

60' 1.0% Lipoderm Liquor IC

60' 2.0% Easynat DLK

Drain

100% water

20' 1% Neutrigam P4

20' 1% Calcium Formate

Drain

Washing

30' 100% water

Drain

Dye + Fatliquering

100% water

30' 0.5% Titanium Dioxide

4.0% Lipoderm Liquor IC

45' 1.0% " Oil SK

10' 0.5% Formic Acid

10' 0.01% Garmin K

Drain, wash

Horse up, hang dry

moisten, stake by hand

ITEM 8 :

FINDINGPROCESSING OF CATTLE AND
BUFFALO HIDE FOR ARMY SHOES

QUANTITY : 221 sides, 500 kg

DATE : 29.11.1984

DRUM NO. : D 10 (2)

Thickness : 1.5 - 1.8 m.m

TIME	%	PRODUCTS	REMARKS
20'	150	Water at 28°C	Speed : 2
10'		Drain	
	100	Water at 28°C	
	1.0	Calcium Formate	
30'	1.2	Sodiumbicarbonate	
		End pH : cut pH :	
20'	150	Water at 28°C	
10'		Drain	
	100	Water at 28°C	
	2.0	Pallux ZMD	
45'	2.0	Ryu bark extract	
		or	
		Mimosa extract	
		Add :	
30'	0.5	Migrosine crystal	
		Add :	
	4.0	Olinol 77	
	0.5	Pallen S	
45'	0.5	Olinol NL	
20'	0.2	Formic Acid (Dil. 1:5)	
20'	0.5	Lipamin Liquor 80	
10'	0.01	Garmin K	
		End pH 4.0	
		Cut pH 4.5	
		End temp. : 28.5°C	
		End time : 7.00 a.m.	
		End date : 30.11.84	

ITEM 9 :

PROCESS OF GOAT/SHEEP SKINS FOR (MERCURY)
LIMING LEATHERFINDING

DATE : 4.12.1984

QUANTITY : 530 pcs = 220 kg

Thickness 1 m.m

DRUM : 32.5

TIME	%	PRODUCTS	REMARKS
20'	150	Water at 28°C	
10'		Drain	
	100	Water at 28°C	
	1.0	Calcium Formate	
60'	1.0	Sodium carbonate	End pH : 6.0
10'		Drain	
20'	100	Water at 28°C	
10'		Drain	
20'	100	Water at 28°C	
10'		Drain	
	100	Water at 28°C	
	1.0	Pollutax SWLF	
	3.0	Olinol 77	
	0.5	Pallan 6	
45'	0.5	Olinol HL	

End pH : 5 cut pH : 4.5

End temp : 28.5°C

End time : 8:00 a.m.

End date : 5.12.1984

FINDING

Item 10 :

REPAIRING OF OX/COW UPHOLSTERY LEATHER

Thickness 1.3 mm

TIME	%	PRODUCTS	REMARKS
<u>Neutralization</u>			
60'	60)	Water at 35°C	
	4)	Chrome powder	
	3)	Lipoderm liquor IC	
30'	1)	Neutrigan P4	
)		
	1)	Sodium Bicarbonate	
30'	1	Neutrigan P4	Bromocresolgreen test out pH : 5.5 Drain (washing) Drain
30'	300	Water at 40°C	Drain
30'	300	Water at 45°C	Drain
<u>Dyeing + Fatliquoring</u>			
45'	100)	Water at 50°C	
	4)	Tannal GH	
45'	(2	Luganil Dyestudd	
	(1	Ammonia	
	10)	Lipoderm liquor IC	
60'	3)	Immergan A	
	0.3)	Soda Ash	
10'	0.1	Carmin K	
10'	0.5	Formic Acid	Drain Horse up set out/sung dry moister, stake, mulling, lbr toggle, trimming. Ready to finish

ITEM 11 :

FINDING

RETANNAGE OF BUFFALO FOR WAIST BELT LEATHER

Material Buffalo wet blue from
wet section grade II
thickness 2.5 mm

TIME	%	PRODUCTS	REMARKS
<u>Re-chroming</u>			
	(100	Water	
60'	(4	Chrome powder	
	(0.2	Sodium Bicarbonate	
			Drain
<u>Neutralisation</u>			
	(100	Water	
20'	(1.0	Neutrigan P4	
20'	0.5	Calcium Formate	
20'	1.0	Sodium Bicarbonate	cut pH check 5.5
			Drain, wash
<u>Dye + Fatliquoring</u>			
	100	Water	
10'	1.5	Ammonia (liq)	
30'	1.0	Nigrosine	
15'	0.5	Formic Acid	
30'	0.5	Hemedine Oxide	
45'	1)	Mimosa (as powder)	
	4)	Basyntan D	
45'	6)	Lipoderm liquor IC	
	2)	Fellan S	
20'	2	Formic Acid	
20'	0.5	Lipamin Liquor NO	pH 3.8 (float)
		(water cleaned)	Drain wash 10'
			Hoove up, set out
			1 minute vacuum; hang dry; moisten
			stake, toggle, trimming
<u>Finishing</u>			
		Normal finishing	

ITEM 12 :

FINDING

PROCESSING OF GOAT SKIN FOR SHRUNKEN GRAIN LEATHER

TIME	%	PRODUCTS	REMARKS
<u>Soaking</u>			
	200.0	Water	
	0.05	Garmin K	
			Leave overnight, drain, pile up
<u>Lime painting</u>			
	10.0	Lime powder	
	6.0	Sodium Sulphide (liq) No' 25"	
			Apply on flesh side, pile flesh to flesh
			After 3 hrs. unhair by pushing with sticker
			lining in pit
<u>Lining</u>			
	200.0	Water	
4 days	3.0	Lime powder	
	1.0	Soda Ash	handle twice a day
			leave 4 days
<u>De-lining</u>			
	100.0	Water	
30'	1.0	Ammonium sulphate	
	0.5	Decalcal N	
30'	1.5	Oropon CR	
			Drain, scud, 10'
			wash plain water
			Drain, soaking, pelt weight
<u>Hydro-extraction</u>			
15'	10.0	Saw dust	
60'	3.0	Basyntan FC	
<u>Tanning</u>			
	40.0	Water at 40°C	
2 hrs	5.0	Basyntan D	
	3.0	Formic Acid	
1 hr.	5.0	Mimosa	Leave overnight.

ITEM 12 (continued)

PROCESSING OF GOAT SKIN FOR SUNKEN GRAIN LEATHER

TIME	g	PRODUCTS	REMARKS
		ADD	
5 hrs.	8.0	Chrome powder	
1 hr.	1.0	Sodium Bicarbonate	
			pH 3.8
			pile overnight
			Sam shaved to 1 m/m
			shaved weight
		Neutralisation	
	100.0	Water	
20'	1.0	Calcium Formate	
30'	1.0	Neutrigan P4	
			pH 5.0
			wash, drain
		<u>Dye + fatliquoring</u>	
	100.0	Water at 60°C	
10'	2.0	Ammonia liq.	
30'	1.5	Dye stuff	
20'	1.0	Formic Acid	
30'	0.5	Dye stuff	
	5.0)	Lipoderu liquor IC	
45'	1.0)	Pellan "	
	0.5)	Olinor NL	
20'	1.0	Formic Acid	
20'	0.5	Lipamin Liquor NG	
			pH 3.8
			Drain wash, drain
			Hoove up, sam, hang dry, condition, stake,
			milling, light toggling, dry finishing.

ITEM 13 :

PROCESSING OF GOAT/SHEEP FOR HAND GLOVING LEATHER

FINDING

DATE : 19.10.84

QUANTITY : 755 pcs = 270 kg.

DEEM NO. : S 2.5

Thickness 1 mm

TIME	%	PRODUCTS	REMARKS
20'	200	Water at 28°C	
10'		Drain	
	80	Water at 28°C	
	6.0	Chrome powder	
60'	0.5	Sodium Bicarbonate	
	1.0	Sodium Bicarbonate	
	1.0	Nourigum P4	
40'	0.5	Calcium formate	End pH 5.5 ⁺
20'	0.5	Sodium Bicarbonate	End pH 6
10'		Drain	
20'	200	Water at 28°C	
10'		Drain	
	100	Water at 28°C	
	2.0	Pallan S	
20'	2.0	Basytan D	
30'	1.0	Nigrosine crystal	
	6.0	Sulphonated oil	
45'	0.5	Clinol ML	
20'	1.0	Formic Acid	
		ADD	
20'	0.5	Lipermin liquor NO	

End pH = 4.0

End time = 7.00 a.m.

End date = 20.10.84

ITEM 13 (A) :FINDING

Leather Factory No. II (Rangoon)

PROCESSING OF INDUSTRIAL GLOVING LEATHER

From chrome split (from L.F(R) No. 1

Trimming

shaved	1.2 m/m	
45'	washing 150 - 200% water drain	
	150% water	
2 hrs	1.0% calcium formate	
	1.0% sodium bicarbonate	pH
30'	washing 150% water drain	
	150% water	
	8% sulphonated oil (TBO)	
	2% raw oil (raw castor oil)	
	drain, pile, hanging	
	drying (on bamboo)	
(8 hrs. running	milling (2 days)	
(
(stop overnight		
(
(<u>next day</u>		
(
(8 hrs. running		
(
(stop overnight - Buffing		
	measuring	

FindingsITEM 14 : Recipe for finishing

(A) For corrected grain (sub grain) leather (Auto spraying)
 Buffed, Dedusting :

1. Bottom coat

Shading black paste	200 pts.	
Binder emeryl E	200 "	
Water	600 "	leave overnight

2. Season coat

Bright black paste	200 pts.
Binder AH	200 "
Water	600 "
Formaldehyde	25 "

3. Top coat

Cassia powder	25 pts.	
Binder AH	300 "	
Wachs G	25 "	
Water	600 "	leave overnight

Embossing

(B) For shoe plain leather (Rotary coating machine)

1. Bottom coat

Shading black	150 pts
Lipton wx A(a)Wachs G	
G	120 "
Astacin soft PU	225 "
Cerial binder OBN	225 "
Astocin finish PUD	150 "
Ethylglycol	75 "
Baksool paste D	60 "
Filler B	75 "
Water	120 "

Season & top coat apply same as (A)2, (A) 3.

Rotary Ironing

(C) For skin (same recipe as A)

Rotary Ironing

A N N E X 2

CONTENTS

Item

1. New Technology Process, Cow hides
for Shoe Upper Leather

2. New Technology for Cow-Buffalo
hides, short time tanning process
for Sole-Leather

NEW TECHNOLOGY PROCESS FOR COW HIDE PRODUCTION - 1984/85

(PRE SOAK FOR DRY HIDES)

WET SALTED HIDES :

<u>Dirt soak</u>	100% water	32-34°C	40'
(Drum)	Wash	35°C	10'
<u>Main soak</u>	200% water	26-27°C	
(Drum)	0.8% Pellvit KAB/P		
	0.2% Caustic soda	50% 1:5	
	0.05% Aracit K		270'
	Final temp.	27-28°C, pH 10.0	
	Drain well		30'
<u>Liming</u>	25% water	20°C	
(Drum)	3.5% lime hydrate		
	1.2% Erhavit AE		
	1.4% Sodium sulphide		
	0.3% Hostopal 1:10 (hot diss.)		
			60' at 4 rpm
			60' stop
ADD	150% water	20°C	
	0.05% Amollan AG		
	0.2% Caustic soda	50% 1:5	30' at 4 rpm
			stop
	After 2 hrs, pH control :	pH 12-13	
	temp "	25-26°C	
	Run 2' every 1 hour for another 12½ hours		
	Change direction, like 1 hrs to the left		
	" 2 hrs to the right etc.		
	Final pH	12.5	
	" temp.	25-26°C	
	Drain liming float		
	200% water	24°C	20'
<u>Wash</u>	Drain float		
(no running water)	200% water	24°C	
	0.4% Dermascal D		5' at 4 rpm
			Stop 45'
	Drain float		
	Flesh-split, pelt weight		
<u>Reliming</u>	200% water	20°C	
	1.5% lime hydrate		2' at 4 rpm
	Run seconds every 2 hrs.		
	Total time	20 hrs.	
	Drain		
<u>Wash</u>	200% water	20°C	10'
	Drain		

New Process - cow hide production

Wash 200% water 25°C 10'
Drain

Deliming Water
1.2% Ammonium Chloride
0.8% " sulphate
0.4% sodium bisulphite 60'
cross cut pH 8.3 - 8.5, colourless
Temp. 29-30°C

ADD 50% water
0.2% Oropon OR 37°C 1 - 3 hrs.
pH 8.3 - 8.5
Temp. 29 - 30°C

Drain float
200% water 22°C 10' at 4 rpm
Drain
200% water 25°C 10' at 4 rpm
Drain

Pickle 30% water 25°C
5% salt 10' above 6.5°Be

ADD 0.7% Formic acid 1:8 20'
ADD 0.7% Sulphuric acid 1:20 60'
ADD 1-3% (fatliquor) 1:5 diss. at 60°C 60' pH 3.3-3.5
ADD 0.5% Relugan GTW 1:3 30'
ADD 0.05% Preventol L 1:5 10'
ADD 3% Chromosal B 90'
ADD 5-7% Baychrom A 500 pH 3.8-3.9
Temp. 38-30°C

Drain float
100% water 20°C 1. Hydrolyses 10'
Drain
100% water 20°C 2. " 10'
0.1% Preventol L 1.5 Horse or pile

New technologySole leather process with short tanning timeMaterial : Fleshed, in delimed pelt (liming time 3 - 4 days)

- pelt weight

wash 10 - 15' cold

Drain completely

Without float : +4 - 5% Baysel C

3 - 4% Tanigen CV

0.1 - 0.2% sodium bisulphite powder

+ 1.5 - 2.0% Formic acid 85%

dilute 1:2, through axle

- heavy hides, keep over night 3 - 4

check up 1) pH float 3.2 - 3.5

2) cut : uniform yellowish green with BCG

3) temp. 38 - 40°C but not higher

(adjust speed of drum)

(if necessary)

Wash 10 - 15' cold

or rinse Drain

Main tannage

Without float

5 - 6% Tanigen RF'S 1 - 2 hr

+ 20 - 22% Quebracho sulph powder 2 hr

(or crushed solids)

+ 13 - 14% Mimosa crushed solids 14 - 18 hrs

final temp. 40 - 42°C

(at least around 35°C)

+ 1 - 2 % Tanigen BL or HLG

5 - 10% water 20 - 30'

unload pile 2 days

continue as usual

New Technology: Recipe for rapid tannage of Sole Leather

Rejects, relimed after fleshing for 48 - 60 hrs

Rinse : 20' water cold
45% Baycel C 28°CDelime/ 2 - 3 hrs. 0.2% Sodium bisulphite
Pickle 1½-2½ hrs. 1.6% Formic acid pH 3.2 - 3.5

Drain

Pretan 3 hrs. .9% Tanigan RFS
0.4% Fatliquor 30°C
colour yellowish : stop overnightWash 20' 300% water 22°C drainWash 20' 300% water 22°C drainTanning 2 hrs. 1% Mimosa
0.5% Fatliquor
5% Mimosa
8% Quebracho
3 hrs. 2% Valonea 32°C
5 hrs. Run run till full penetration,
stop over nightBleach 30' 0.7% Tanigan BL
15' 0.2% Preventol
pile for 3 dayswash 20' 400% water 22°C
" " " " pile over night
sam, shave, weighStuffing 5' Drum in steam warmed up drum,
10' 2% Magnesium sulphate
1-2% Mimosa
1-2% Quebracho
60' 1-2% Valonea
20' 1.5% Molasses
20' 0.7% Bastamol K
1-2% Lipamin liquor
20' 0.5% Olinor K
30' Steam drum for 1' every 10'
10' 1% Tanigan BL

Pile, set out, hand oil against oxydation, hang dry

Roll I Time 200 Pressure
" II " 300 "

Yield 45 - 87% from peltweight 2.18 kg peltweight = 1 kg dry sole leather

Remarks : Yield can be increased by additional quantities of
tanning/stuffingSuitable drums

- Speed 2.3 or 4 rpm but not above 4 rpm
- Peltweight : 400 - 500 kg 500 - 700 900 - 1300 kg
Drum diameter 2 m 2.3 m 2.5 - 2.8 m
width 2.2m 2.5 m 3.5 - 4.0 m
- Drum pegs not longer than 14 cm

ANNEX 3.C O N T E N T STESTS, EXPERIMENTS AND TRIALS FOR VARIOUS TYPES OF
LEATHER FROM COW-BUFFALO HIDES, SHEEP AND GOAT SKINS/
FATLIQUORS/OILSItem Trial No.

1	1	<u>Sheep and Goat</u> : Short lining, bating trial, tanning with reduced chrome liquors.
2	1 A	<u>Sheep and Goat</u> : Retanning for lining
3	1 B	<u>Goat</u> : Retanning for shoe upper leather.
4	1 B-A	<u>Goat</u> : Finishing of shoe upper leather.
5	2	<u>Buffalo</u> : Old stock, retanning/neutralization.
6	3	<u>Cow-Buffalo</u> : Rechroming old stocks.
7	3 A	<u>Cow</u> : Retanning old stocks.
8	3 B	<u>Buffalo</u> : " " " after rechroming.
9	4	<u>Cow</u> : Rechroming old stocks.
10	4 A	<u>Cow</u> : Retanning for natural crust for export.
11	4 B	<u>Cow</u> : Retanning for light colour crust for export.
12	5	<u>Cow, Sheep, Goat</u> : Rechroming of old stock.
13	5 A	<u>Goat</u> : Retanning dyeing for lining/crust.
14	5 B	<u>Cow</u> : Retanning for natural crust, for export.
15	5 C	<u>Cow</u> : Retanning with local products.
16	6	<u>Goat</u> : Lime painting

Annex 3. (Contd.)

<u>Item</u>	<u>Trial No.</u>	
17	6 A	<u>Goat</u> : Relining trial, chrome - tanning with self-reduced liquors.
18	6 A-1	<u>Goat</u> : Red brown shade, penetration dyeing retanning.
19	6 A-2	<u>Goat</u> : Yellow beige shade penetration dyeing retanning.
20	6 B	<u>Goat</u> : Liming, bating trial, chrome tanning with self-reduced liquors.
21	7	<u>Sheep</u> : Relining and bating trial, chrome tanning with reduced liquors.
22	7 A	<u>Sheep</u> : For boxing gloves, orange- brown.
23	7 B	<u>Sheep</u> : For boxing gloves, black.
24	7 C	<u>Sheep</u> : " " " , red.
25	8 A	<u>Cow</u> : (Light weight) New tanning with self reduced chrome liquors. Retanning for short shoe uppers, black, tanigan LD only.
26	8 B	<u>Cow</u> : (Light weight) New tanning with self reduced chrome liquors. Retanning for short shoe uppers, tanigan LD/mimosa 50:50.
27	9	<u>Cow</u> : Retanning, black, "zug grain" neutralization with calcium formiate.
28	10	<u>Cow</u> : Retanning black "zug grain" neutralization with sodium formiate.
29	10 A	<u>Reduction of chrome liquors</u> No.1. 33% basicity No.2. 38% " No.3. 45% "
30	11	<u>Cow</u> : Retanning Natural Crust 1.8 mm
31	12	: " black soft shoe uppers.

Annex 3. (Contd.)

<u>Item</u>	<u>Trial No.</u>	
32	13	<u>Cow</u> : Retanning natural crust, 1.5 mm.
33	6 B-1	<u>Goat</u> : for Garment suede out of normal production.
34	14	<u>Cow</u> : Football leather
35	15	<u>Goat</u> : Garment suede
36	15 A	<u>Goat</u> : Garment suede
37	16	<u>Cow</u> : Retanning, natural crust 1.8 mm
38	5 D	<u>Cow</u> : Old stock, rechromed, retanned, 1.8 mm
39	17	<u>Cow</u> : Light colour crust
40	1 B	<u>Goat</u> : Shoe upper leather (2nd trial)
41	7 B	<u>Sheep</u> : Boxing glove (2nd trial)
42	13 A	<u>Cow</u> : Natural Crust
43	17 A	<u>Cow</u> : Light colour crust
44	18	<u>Cow</u> : Black crust
45	19	<u>Goat/Cow</u> : Shoe uppers, light colour.
46(19.2.85)		<u>Cow</u> : Waste-Belting leather
47	20	<u>Goat</u> : Garment
48	21	<u>Cow</u> : Shoe uppers
49	22	Tatliquor-Oil Tests

ITEM 1 :TRIAL 1

PROCESSING OF GOAT/SHEEP SKIN FOR DELIMING TO TANNING

QUANTITY : 10 pcs

DATE : 30.11.84

DRUM NO. : Liming as per Factory process
Deliming to Tanning

LOT NO. : 280

TIME	%	PRODUCTS	REMARKS
20'	100.0	Water at 28°C	
10'		Drain	
20'	100.0	Water at 28°C	
10'		Drain	
	80.0	Water at 35°C	
	1.0	Decalcal N powder	
	0.5	Ammonium sulphate	
	1.5	Oropon OR	
210'	0.5	Bascal S	End pH = 8.0, check full deliming with phenolphthalein indicator (as colourless)
10'		Drain	
30'	300.0	Water at 28°C	
10'		Drain	
	40.0	Water at 28°C	
15'	8.0	Salt	
		Be' - 7.0	
	0.4	ADD Formic Acid 1:5	
120'	0.5	Sulphuric Acid	End pH = 3.0
		Chrome Tanning	
		Drain 50% of pickle bath	
30'	700cc	ADD liquor I of 40°Be'	
60'	600cc	ADD liquor II "	
60'	600cc	ADD liquor III "	
30'	40%	ADD water at 28°C,	pH control, 2.5
120'	2.0%	Sodium Bicarbonate 1:10	slowly Final pH : 4.0 Boiling Test

ITEM 2 :TRIAL No. 1 A

PROCESSING OF GOAT/SHEEP SKIN FOR RETANNING

QUANTITY : 2 sheep skin weight 1839
 1 goat " " 486
2325 gm

DATE : 6.12.1984

Thickness

1 Goat) 0.7 mm
 1 Sheep)
 1 Sheep 1.2 mm

TIME	%	PRODUCTS	REMARKS
10'	300.0	wash (water) cold	
	150.0	water at 35°C	
	2.0)	Basyntan MN	
30'	1.0)	Calcium Formiate	
30'	0.5	Sodium Bicarbonate	(fill penetration) pH check 6.2
10'	300.0	water (wash) cold	
	100.0	water	
	1.0)	Basyntan MN	
10'	2.0)	Ammonia (liq)	
30'	4.0	Laganil Red MG powder	check penetration
20'	1.5	Pellutax SWLF	
10'	150.0	Water at 50°C	
	(6.0	Olinal 77)	
30'	(0.5	Pellan S) dil. 1:4	
20'	1.5	Formic Acid dil. 1:5	10' x 2
	6.0)	Olinal 77)	
45'	0.5)	Pellan S) dil. 1:4	
	1.0)	Olinal NL)	pH check 3.8
20'	0.1	Formic Acid dil. 1:5	final pH check 3.6
10'		Rinse cold	

ITEM 3 :TRL: L No. 1 B

PROCESSING OF GOAT SKINS FOR SHOE UPPER LEATHER

QUANTITY : 7 pieces Goat

DATE : 10.12.1984

shaved weight 3657 gm

thickness 1.0 m.m.

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water wash cold, drain	
	100.0	Water cold	
10'	1.0	Calcium formiate	
50'	0.6	Sodium bicarbonate	ph float 6.0
10'	300.0	Water wash, drain	
	80.0)	Water cold	
15'	2.0)	Olinor 77	
	0.5)	Pellan S	
10'	2.0	Basytan D (powder)	
30'	3.0	Mimosa "	
20'	2.0	Relugan RE (start temp)	
20'	0.6	Nigrosine (dil. 1:10)	
	3.0)	Olinor 77)	
45'	0.5)	Pellan S) Emulsified	
	0.5)	Olinor NL)	
10'	150.0	Water at 50°C	
			pH : 5.2
5'	0.5	Formic Acid 1:5	
20'	0.4	Nigrosine (dil. 1:10)	
5'	0.1	Formic Acid	
			pH : 3.7
15'	0.5	Lipasin liquor NO	
			pH : 4.0
10'		Pinse cold	

ITEM 4 :

TRIAL NO. 1 B-A

FINISHING OF GOATSKINS FOR CHEVREAU

1. Snuff the coarse grain of the Goat skins on the buffing machine with fine/used buffing paper
2. Polish the same skins with the reverse side of old buffing paper.

Normal finishing as per Factory recipe.

Result : Smooth grain
Goat skins, Chevreau type
with plating finish
for shoe upper leather

ITEM 5 :TRIAL No. 2

PROCESSING OF BUFFALO FOR RETANNING

QUANTITY : 5 sides 1.8 mm

DATE : 4.12.1984

Lab. from Tannery No. 2
 9% Chromosal B on Pelt Weight,
 wet blue material from LF(R) No. 2

TIME	%	PRODUCTS	REMARKS
	300.0	Water (cold) drain	
	150.0	Water cold	
	2.2	NaHCO ₃	
90'	0.2	Calcium Formiate	B.C.G. Test
		pH (float) - 4.8	20% blue 60% yellow 20% blue
10'	300.0	Rinse (cold)	
	100.0	Water cold	
15'	1/3	Fatliquor	
10'	2.0	Pallutax ZND powder	
	(2.0	Bark extract	
20'	(2.0	Relugan RE (heating start)	
	150.0	Water at 50°C	
30'	0.5	Nigrosine dilute (1:10)	
45'	2/3	Fatliquor	
15'	0.2	Formic Acid - 1:5	pH check - 3.6
	(0.5	Lipamin liquor NO	pH 3.0
20'	(0.1	Garmin K	
		pH 3.2	
		Rinse cold	

Fatliquor combination

6.0% Olinor 77 only products mix well) after 10' add
 0.5% Pellian S to emulsify) hot water
 1.0% Olinor NL

ITEM 6 :TRIAL No. 3

PROCESSING OF OX/COW & BUFFALO FOR RETANNING

QUANTITY : 5 sides medium Cow - 14.4 kg)
" " Buffalo - 13.6 kg) 28 kg.

DATE : 5.12.1984

from Tannery No. 1 (Tanned 8% chromosal on soaked weight)

TIME	%	PRODUCTS	REMARKS
10'	300	Wash (cold)	
	60	Water at 38°C	
	1.4	Chrome liquor No. 3, 40°Be'	
60'	0.4	NaHCO ₃ (Sodiumbicarbonate)	
		pH check 3.0	
60'	0.4	NaHCO ₃	
		pH check 3.4	
60'	0.4	NaHCO ₃	
30'	200	Water	
		pH check 4	
		stop overnight	
30'		Rin	next morning
		pH 3.3	
30'	0.2	NaHCO ₃	
		pH 4.0 - 4.1	

ITEM 7 :TRIAL No. 3 A

PROCESSING OF CATTLEHIDES FOR RETANNING

QUANTITY : 5 sides of cow hides

DATE : 6.12.1984

shaved weight - 14400 gm

LOT No. : 3 (a)

Thickness - 1.8 mm

pH 3.4 - 3.6

TIME	%	PRODUCTS	REMARKS
10'	300.0	Wash (cold) drain	
	150.0	Water (cold)	
	1.0	Sodium Bicarbonate	
30'	0.4	Calcium Formiate	
			pH float 6.3 B.C.G. Test
10'	300.0	Rinse (cold)	33% blue
	100.0	Water (cold)	33% yellow
			33% blue
15'	½	Fatliquor	
10'	2.0	Pellutax 2ND	
	2.0)	Bark Extract	
20'	2.0)	Mimosa	
30'	2.0	Relugan HE (start temp)	
	150.0	Water at 50°C	pH 5.2
30'	0.5	Nigrosine dil (1:10)	
			pH 5.0
45'	½	Fatliquor	
15'	0.2	Formic Acid - 1:5	pH 4.6
			pH 3.7
	0.5)	Lipamin Liquor NO	
20'	0.01)	Garmin K	
10'		Rinse (cold)	
<u>Fat liquor combination</u>			
	6.0	Olinal 77	
	0.5	Pellan S	
	1.0	Olinal NL	

TRIAL No. 3 B

ITEM 8 :PROCESSING OF BUFFALO FOR RETAINING

DATE : 7.12.84

Shaved weight - 13600 gm
Thickness - 1.8 mm

LOT NO. : 3 (b)

TIME	%	PRODUCTS	REMARKS
10'	300.0	wash water cold drain	
	150.0	water (cold)	
	0.6	sodium bicarbonate	
30'	0.2	calcium formate	
		pH float 5.6	
10'	300.0	rinse (cold)	
	100.0	water (cold)	
15'	%	Fatliquor	
10'	2.0	Pellutax ZND	
	2.0)	Bark extract	
20'	2.0)	Minoson	
30'	2.0	Relugon EE (start temp)	
		pH check 5.0	
	150.0	water at 50°C	
30'	0.3	Nigrosine (dil. 1:10)	pH 4.8
45'	%	Fatliquor	pH 4.6
5'	0.2	Formic Acid 1:5	pH 3.6
15'	0.2	Nigrosine (dil 1:10)	pH 3.4
	0.5)	Lipamin liquor NO	
20'	0.01)	Garmin K	
		pH 3.8	
10'		Rinse (cold)	
		<u>Fatliquor combination</u>	
	6.0	Olinor 77	
	0.5	Pallan S	
	1.0	Olinor NL	

TRIAL NO. 4ITEM No. 9 :PROCESSING OF CATTLEHIDES FOR RECHROMING

DATE : 11.12.84

QUANTITY : 8 sides of cow hides Selection No.3 LOT NO. :

Shaved weight - 22800 gm

Thickness 1.7 - 1.8 mm

(From old stock only)

TIME	%	PRODUCTS	REMARKS
10-15'	200.0	Water wash cold drain out	
	(60.0	Water	
	(3.5	Chromosal B (26% Cr ₂ O ₃) or	
60'	(	Reduced chrome liquor No. 3	
	(0.2	Sodium Bicarbonate	
2 x 20'	0.2	Sodium Bicarbonate	
2 x 20'	0.2	Sodium Bicarbonate	
30'	200.0	Water at 40°C pH 4.0 step overnight next morning pH 3.4	
60'	0.3	Sodium Bicarbonate End pH 4 Drain, wash or rinse Start retanning	

Item 10 :TRIAL NO. 4 APROCESSING OF CATTLEHIDES FOR NATURAL
CRUST FOR EXPORT

DATE : 12.12.84

Quantity : 4 side cow hide

Thickness - 1.7 - 1.8 mm
Shaved weight - 11400 gm

TIME	%	PRODUCTS	REMARKS
10'	300.0	water, cold, drain	
	(150.0	water, cold	
30'	(0.5	sodium bicarbonate	
	(0.2	calcium formate	
			float pH - 5.3 cut pH - 25% 90% 25%
10'		rinse cold	
	(100.0	water, cold	
15'	(½	fatliquor	
	1.0)	Pellutax SWLF	
20'	2.0)	Pellutax ZND	
20'	(2.0	Bark Extract	
	(3.0	Mimosa	
30'	2.5	Maluga HB (start temp)	
15'	150.0	Water at 30°C	
45'	½	Fatliquor	
			pH 4.2
30'	0.1	Formic Acid 1:5	pH 3.7
	0.5)	Lipamin liquor NO	
20'	0.1)	Garnin K	pH 3.8
10'		Rinse cold	
		<u>Fatliquor combination</u>	
	6.5	Oliner 77	Thoroughly
	0.5	Pallen S	mixed -
	0.5	Oliner NL	Emulsify

ITEM 11 :

TRIAL No. 4 B

PROCESSING OF CATTLEHIDES FOR RETANNING FOR
LIGHT COLOUR CRUST FOR EXPORT (light beige colour)

QUANTITY : 4 - side cow hides, old stock
(rechromed)

Shaved - 1.7 - 1.8 mm
Shaving weight - 11,400 kg.

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water, wash cold drain	
	150.0)	Water, cold	
30'	0.5)	Sodium Bicarbonate	
	0.2)	Calcium formate	pH cut 30% blue 40% yellow 30% blue
		drain	pH float 5.3
	(100.0	water, cold	
15'	(3.0	Oliner 77	
	(0.5	Pellan S	
	1.5)	Pellutax SMLF	
15'	1.5)	Basyntan DLE	
20'	3.0	Relugan RE (dil. 1:5)	
45'	3.0	Basyntan DLE	pH 4.1 check exhaustion drain
15'	150.0	Water at 50°C	drain
	150.0)	Water at (50-55°C)	
	4.0)	Oliner 77	
45'	0.5)	Pellan S	
	0.5)	Oliner NL	
20'	2.0	Basyntan DLE	pH 3.6
30'	0.02	Garnin K	pH 3.7
10'		Rinse cold	

ITEM 12 :PROCESSING OF CATTLE HIDES FOR RECHROMING

QUANTITY : 22 sides of cow hide 72.3 kg DATE : 12.12.84

5 pcs. of sheepskin)
5 pcs. of goat skin) 4.5 kg

total shaved weight 76.8 kg

Thickness : 1.7 - 1.8 mm

TIME	%	PRODUCTS	REMARKS
15'	200.0	Water, wash, cold	
			drain out
	160.0)	water	
)		
60'	4.3)	reduced chrome liquor No. 3	
)		
	0.2)	sodium bicarbonate	
2 x 20'	0.2	"	pH 3.2
2 x 20'	0.2	"	pH 3.7
			pH 4.1
Run 5'/	200.0	Water at 40°C	pH 4.0
1 hr.		next morning	
		drain, piling	

ITEM 13 :TRIAL NO. 5 APROCESSING OF GOAT SKINS FOR LINING
LEATHER, COLOURED

DATE : 13.12.84

After chrome tanning shaving to 0.8 mm
shaved weight 4.5 kg

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water, wash cold drain	
	200.0)	Water, cold	
45'	1.5)	Sodium bicarbonate	
	1.0)	Calcium formate	float pH 6.2 cut, fully blue drain
15'	300.0	Water, wash, cold	
10'		Rinse cold	
	100.0	Water, cold	
15'	2.0	Olinor 77	
15'	2.0	Pellutax SMLF	
15'	0.3	Lugmail Olive Brown N (dil. 1:10)	
30'	2.0	Mimosa	
10'	150.0	Water at 50°C	
	3.0)	Olinor 77	
5'	0.5)	Pellan S	pH 5.2
20'	0.5	Formic Acid 1:5	pH 3.8
	1.0)	Lipasin liquor SO	
20'	0.015)	Garmin K	full absorption pH 4.0
10'		Rinse, cold	

ITEM 14 :

TRIAL NO. 5 B

PROCESSING OF COW HIDE FOR NATURAL CRUST FOR EXPORT

QUANTITY : 5 sides cow reshredded
shaved to 1.7 - 1.8 mm
shaved weight - 16.4 kg

DATE : 20.12.84

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water, washing, drain	
	150.0)	Water 30°C	
15'	2.0)	Basyntan MN	
	(0.3	Sodium Bicarbonate	
30'	(0.2	Calcium Formiate	float pH 5.8
10'		Rinse	
	100.0	Water 30°C	
20'	%	Fatliquor	
30'	3.5	Relugan BE	
	2.0)	Pellutax ZND	
30'	4.0)	Mimosa	
15'	150.0	Water, 50°C	
45'	2/3	Fatliquor	pH 4.7
20'	0.15	Formic Acid 1:5	pH 3.6
	(0.5	Lipamin liquor NO	
20'	(0.01	Garmin K	
			pH 3.7
10'		Rinse cold	
		<u>Fatliquor combination</u>	
	5.5	Olinor 77	
	0.5	Pellan S	
	0.5	Olinor NL	

ITEM 15 :

TRIAL NO. 5 C

PROCESSING OF COW HIDES WITH LOCAL PRODUCTS

DATE ; 1.1.85

QUANTITY : 5 sides cow rechromed from old stock
black Army leather, low cost quality

Average 1 side = 3.3 kg
shaved weight = 16.5 kg

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water, wash, cold, drain	
	150.0	Water	
	0.4)	Sodium Bicarbonate	
10'	0.2)	Neutrigan P ⁴	
5'	1.0	TRO (sulphated castor oil)	
20'	2.0	Tanigan PR	pH float 5.8
			pH cut Blue 25%
			Yellow 50%
			Blue 25%
10'		Rinse, cold	
	100.0	Water, cold	
20'	1/2	Fatliquor	
30'	3.0	Relugan BB	
	(3.0	Byu Bark Extract	
45'	(3.0	Mimosa	
	150.0	Water, 55°C	
10'	0.4	Nigrosine	
45'	2/3	Fatliquor	
5'	0.25	Formic Acid 1:5	
10'	0.6	Nigrosine	pH 3.6
	0.5)	Lipamin liquor NO	
20'	0.01)	Garmin K	
			pH 3.8
10'		Rinse cold	
		<u>Fatliquor combination</u>	
	2.5	Oliner 77	412.5 gm
	1.5	TRO	247.5 gm
	0.5	Pellan S	82.5 gm
	0.5	Oliner KL	82.5 gm

ITEM 16 :TRIAL NO. 6PROCESSING OF GOAT SKIN FROM SOAKING TO
LIME PAINTING

QUANTITY : 30 pcs. skin

DATE : 11.12.84

salted weight : 26 kg

TIME	%	PRODUCTS	REMARKS
		Soaking	
	300.0	Water	
	0.5	Casmollan BH	
			1 day leave overnight
12.12.84		Lime painting	
		6 parts Sodium sulphide (liq) of 15°Be'	
	10	" Lime powder	
		+ water (adjusted to 25°Be')	
		Apply on flesh-sides	
		Pile flesh to flesh	
		4 - 6 hour	
		Unhair with slicker	
		Liming in pit	

ITEM 17 :TRIAL NO. 6 APROCESSING OF GOATSKINS - LONGER LIMING

DATE 13.12.84

QUANTITY : 20 goat skin, small size

2 day liming

1 day reliming (1% lime)

16.8 kg 37 lbs. Peltweight

TIME	%	PRODUCTS	REMARKS
		Normal factory process only Orepon from the beginning	
		<u>Reliming</u>	
	150.0	Water	
	1.0	Hydrated lime powder	leave 1 day overnight
20'	100.0	Water	drain
20'	100.0	Water	drain
14.12.84		<u>Deliming</u>	
	80.0	Water at 35°C	
	1.0	Decalcal N powder	
210'	0.5	Ammonium sulphate	
	1.5	Orepon OR	
	0.5	Bascal B	
			End pH 6.4 check full deliming with phenolphthelin indicator Drain
30'	300.0	Water	Drain
		<u>Pickling and Tanning</u>	
	40.0	Water	
15'	8.0	Salt	Check Be' 8.0
	0.4	Formic Acid 1:5	
			Dil. 1:10
120'	0.5	Sulphuric Acid	End pH 3.0

ITEM 17 (continued)TRIAL NO. 6 A

DATE : 15.12.1984

8% Chromosal B (or) Reduced Chrome Liquor I II III of 40°Be°

TIME	%	PRODUCTS	REMARKS
		Chrome tanning	
		Drain 50% of pickle bath	
30'	788 cc	Liquor I of 40°Be°	
60'	676 cc	" II " "	
60'	676 cc	" III " "	
30'	40.0	Water at 38°C - 40°C	
			pH control 2.5
120'	2.0	Sodium Bicarbonate	1:10, slowly
			final pH 4.0
			Boiling test

ITEM 18 :

TRIAL No. 6 A-1

PROCESSING OF GOAT SKINS FOR RED BROWN
SHADE PENETRATION

DATE ; 18.12.84

QUANTITY : 10 pieces goat skins

shave 0.8 mm

shaved weight 7 lb. 7 oz. = 3.38 kg

TIME	%	PRODUCTS	REMARKS
		Normal Factory Process, (1 day liming + 1 day reliming, Oropon added from the beginning)	
10'	300.0	Water, wash, cold	
	150.0	Water 35°C	
	2.0)	Basyntan MN	
30'	1.0)	Calcium Formiate	
30'	0.5	Sodium bicarbonate, full penetration	pH float 6.-
10'	300.0	Water, wash, cold	
	(100.0	Water, cold	
10'	(1.0	Basyntan MN	
	(2.0	Ammonia liq. 1:10	
	3.0)	Luganil Red MR)	
30'	1.0)	Luganil brown MR) powder	till full penetration
	(0.75	Pellutax SWLF	
20'	(0.75	Tanigan CF (temp start)	
10'	150.0	Water, 50°C	
	6.0)	Olinor 77)	
30'	0.5)	Pellan S } 1:4	pH 6.6
40'	1.0	Formic Acid 1:5 4 x 10'	pH 4.2
	(7.0	Olinor 77)	
45'	((0.5	Pellan S) emulsify well,	
	(1.0	Olinor ML) add hot water	pH 4.8
20'	0.5	Formic acid 1:5	
			pH 3.8
10'		Rinse cold	

ITEM 19 :

TRIAL No. 6 A-2

PROCESSING OF GOAT SKINS FOR YELLOW BEIGE
SHADE PENETRATION

DATE : 19.12.84

QUANTITY : 10 pieces goat skins

shave 0.8 mm

shaved weight 7 lbs. 8 ozs. = 3.4 kg.

TIME	%	PRODUCTS	REMARKS
		(Normal Factory process, +1 day liming and +1 day reliming, Oropon OR added from the beginning)	
10'	300.0	Water/wash, cold	
	150.0)	Water 35°C	
30'	2.0)	Basyntan MN	
	1.0)	Calcium Formiate	
30'	0.5	Sodium Bicarbonate	full penetration pH float 6.2
10'	300.0	Water/wash, cold	
	100.0)	Water, cold	
10'	1.0)	Basyntan MN	
	1.0)	Ammonia (liq.)	
	1.0)	Luganil Yellow RGG)	
30'	2.0)	" Orange NG }	till full
	0.3)	" Brown NR }	penetration
20'	(1.25	Pellutax SWLF	
	{ 1.25	Tanigan QF	
10'	150.0	Water 50°C	
	6.0)	Olinor 77)	
30'	0.5)	Pellan S) 1:4	
40'	0.5	Formic Acid 1:5 (4 x 10')	pH 4.1
	(7.0	Olinor 77	
45'	(0.5	Pellan S	Emulsify well, add hot water
	(1.0	Olinor NL	
20'	0.5	Formic Acid	pH 3.8
10'		Rinse Cold	

ITEM 20 :PROCESSING OF GOAT SKINS - LIMING & BATINGTRIAL NO. 6 B

DATE : 15.12.84

QUANTITY : 10 goat skins, large size

2 days liming

2 days relining (2% lime)

TIME	%	PRODUCTS	REMARKS
		(Normal factory process, only Oropom from the beginning)	
		<u>Relining</u>	
	150.0	Water, cold	
	2.0	Lime powder	Leave 2 days overnight
20'	100.0	Water (wash)	drain
20'	100.0	Water (wash)	drain
		<u>Deliming</u>	
	80.0	Water at 35°C	
	1.0	Decalcal N (powder)	
210'	0.5	Ammonium Sulphate	
	1.5	Oropom OR	
	0.5	Bascol S	End pH 6.8, check full deliming with phenolphthalein indicator
			drain
30'	300.0	Water (wash)	drain
		<u>Pickling & Tanning</u>	
	40.0	Water	
5-10'	8.0	Salt	check "Be 8.0
	0.4	Formic Acid 1:5	
120'	0.5	Sulphuric Acid 1:10	End pH 3.0

ITEM 20 (continued)

TRIAL No. 6 B

DATE : 17.12.84

8% chromosal B (or)
reduced chrome liquor

Felt weight 12.8 kg

TIME	%	PRODUCTS	REMARKS
<u>Chrome Tanning</u>			
Drain 50% of pickle bath			
30'	600 cc	Chrome liquor I of 40°Bé	
60'	515 cc	" " II "	
	1.63 litres		
60'	515 cc	" " III "	
30'	40.0	Water at 38 - 40°C	
			pH control 2.5
120'	1.5	Sodium Bicarbonate (slowly)	final pH 4.0
			Boiling Test

ITEM 21 :TRIAL No. 7PROCESSING OF SHEEPSKINS - RELIMING AND BATING

DATE : 17.12.84

QUANTITY : 15 sheep skins
 normal liming
 + 3 days reliming
 Pelt weight 21.6 kg

<u>TIME</u>	<u>%</u>	<u>PRODUCTS</u>	<u>REMARKS</u>
		Normal deliming, only Oropon from the beginning	
		<u>Reliming</u>	
	150.0	Water	
	2.0		Leave 3 days overnight
20'	100.0	Water (wash)	
			drain
20'	100.0	Water (wash)	
			drain
		<u>Deliming</u>	
	(80.0	Water at 25°C	
	(1.0	Decalcal N (powder)	
240'	(0.5	Ammonium Sulphate	
	(1.5	Oropon	
	(0.5	Barcal S	
			End pH 8.0, check deliming with phenolphthalein, pelt should be colourless. Drain
30'	300.0	Water (wash)	drain
		<u>Pickling + Tanning</u>	
	40.0	Water	
5-10'	8.0	Salt	
			Check pH 6 - 7
	0.4	Formic Acid 1:5	
120'	0.5	Sulphuric Acid 1:10	
			End pH 3.1

ITEM 21 (continued)

TRIAL No. 7

DATE : 18.12.84

TIME	%	PRODUCTS	REMARKS
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Next morning pH 3.2

Chrome Tanning

Drain 50% of pickle bath

(30'	1013 cc	Chrome liquor I	of 40°Be
2.75 (60'	868 cc	" " II	"
litres 60'	868 cc	" " III	"
30'	40.0	Water at 38° - 40°C	
120'	1.0	Sodium Bicarbonate	

pH 2.8

pH 4.0

stop over night

Next morning

check pH 3.4

adjust to 3.9 - 4.0

during 60-90'

60' 0.5 NaHCO_3

pH 3.9

ITEM 22 :

TRIAL NO. 7 A

PROCESSING OF SHEEPSKINS FOR BOXING GLOVES/HANDBAGS
- ORANGE BROWN

DATE : 21.12.84

QUANTITY : 5 sheepskins

Thickness 1 - 1.2 mm

Shaved weight 6.56 lbs = 3 kg.

TIME	%	PRODUCTS	REMARKS
		Normal lining process 1 day + 3 days relining	
10'	300.0	Water, washing, cold, drain	
	150.0)	Water 35°C	
	12.0)	Olinor 77	
30'	1.0)	Basyntan MN	
	1.0)	Calcium Formiate	
40'	0.6	Sodium Bicarbonate 1:10	pH 6.4 cut - blue
10'	300.0	Wash, cold	
	(100.0	Water, cold	
10'	(1.0	Basyntan MN	
	(2.0	Ammonia 1:10	
	3.5)	Luganil Orange GCC	till full penetration
20'	0.5)	" Brown NR	
	(6.0	Olinor 77)	
20'	(0.5	Pellan S) 1:4, dilute at 60°C	
15'	1.0	Pallutax SWLF powder	
		heating start	
10'	150.0	Water at 50°C	pH 6.2
30'	1.0	Formic Acid 1:5	pH 4.0
	6.0)	Olinor 77	
40'	0.5)	Pellan S mix well for 10'	
	1.0)	Olinor NL add hot water	pH 4.4
3 x 10'	0.5	Formic Acid 1:10	final pH 3.8
10'		Rinse cold	

No finishing

ITEM 23 :PROCESSING OF SHEEPSKIN FOR BOXING
GLOVES - BLACKTRIAL NO. 7 B

DATE : 31.12.84

QUANTITY : 5 sheepskins 1 - 1.2 mm

TIME	%	PRODUCTS	REMARKS
		Normal lining process, 1 day + 3 days relining	
10'	300.0	Water, washing, cold, drain	
	150.0	Water 55°C	
	1.0)	Olinor 77	
30'	1.0)	Easynatan MN	
	1.0)	Calcium Formiate	
40'	0.6	Sodium Bicarbonate (1:10)	pH float 6.4 cut pH blue
10'	300.0	Water, wash, cold	
	(100.0	Water	
15'	(1.0	Easynatan MN	
	(1.0	Ammonia	
30'	0.5	Nigrosine	till full penetration
10'	150.0	Water, 55°C	
	6.0	Olinor 77)	
30'	0.5	Pellan 8)	pH 6.6
5'	0.3	Formic Acid 1:5 1 x 5'	
10'	0.5	Nigrosine	
	5.0)	Olinor 77	
40'	0.5)	Pellan 8	
	1.0)	Olinor NL	pH 5.5
3 x 10'	0.5	Formic Acid 1:5	
20'	1.0	Lipamin liquor NO	pH 3.8
10'		Rinse	
		<u>No finishing</u>	

ITEM 24 :TRIAL NO. 7 CPROCESSING OF SHEEPSKINS FOR
BOXING GLOVES (RED)/HANDBAGS

DATE : 26.12.84

QUANTITY : 5 sheepskins

Thickness 1 - 1.2 mm

Shaved weight 2.9 kg

TIME	%	PRODUCTS	REMARKS
		Normal liming process, 1 day + 3 days reliming	
10'	300.0	Water, washing, cold, drain	
	(150.0)	Water 35°C	
30'	(1.0	Olinor 77	
	(1.0	Basytan MN	
	(1.0	Calcium Formiate	
40'	0.6	Sodium Bicarbonate	
			float pH 6.4, cut - blue
10'	300.0	Water, wash, cold	
	100.0)	Water, cold	
10'	1.0)	Basytan MN	
	2.0)	Ammonia 1:10	
60'	4.0	Logasil R&D NG,	till full penetration
5'	150.0	Water, 55°C	
	6.0	Olinor 77)	
20'	0.5	Pellam S)	
2x 10'	0.5	Formic Acid 1:5	
	(6.0	Olinor 77) mix well 10'	
40'	(0.5	Pellam S) add 60°C water	
	1.0	Olinor NL)	pH 5.0
3x 10'	0.5	Formic Acid 1:5	
			pH 3.8
10'		Rinse cold	

ITEM 25 :

TRIAL NO. 8 A

PROCESSING OF COW HIDE (LIGHT WEIGHT) -
BLACK SOFT SHOE UPPER

(from bulk, light hide, tanned with
 reduced liquors chromotanning pH 3.8)

QUANTITY : 5 cow pieces

Thickness 1.5 mm
 Shaved weight 12.9 kg.

New Production

TIME	%	PRODUCTS	REMARKS
		With Tanigan LD Normal liming, long time in pickle	
10'	300.0	Water, wash, drain 35°C	
	100.0	Water 35°C	
	(2.0	Basyntan MN	or Tanigan PR
15'	(1.0	Olinor 77 1:4 hot diss.	
45'	2.0	Calcium Formate powder	
20'	0.35	Sodium Bicarbonate 1:10	float pH 5 cut: Blue
10'	300.0	Water, wash, 35°C, drain no water	
	2.0)	Olinor 77)	
10'	0.5)	Pellan S) 1:4 hot diss.	
30'	4.0	Relugan RE 1:3 diss	) 4 tanigan LD
120'	8.0	Tanigan LD powder	) 4 minosa
10'	300.0	Water 55°C	pH 5.0
20'	1.0	Nigrosine 1:20 diss.	
	(4.0	Olinor 77	
60'	(0.5	Pellan S	
	(0.5	Olinor ML	
15'	1.0	Formic Acid 1:5	
	5.0)	Chrome liquor No.III (or) 3% chromosal B	
60'	0.3)	Sodium Bicarbonate 1:10	pH 3.6
10'	300.0	Water, wash, cold, drain	
10'		Rinse cold	

ITEM 26 :

TRIAL NO. 8 B

PROCESSING OF COW HIDES FOR BLACK
SOFT SHOE UPPER

DATE : 2.1.85

QUANTITY : 5 cow pieces (from bulk, light hide
tanned with reduced chrome-liquors
tanning pH 3.8)

thickness 1.5 mm New Production
shaved weight

TIME	%	PRODUCTS	REMARKS
		<u>With tanigan LD</u>	
		Normal liming, long time in pickle	
10'	300.0	Water, wash, 35°C drain	
	100.0	Water, 35°C	
	2.0)	Tanigan PR	
15'	1.0)	Oliner 77 1:4 hot diss.	
45'	2.0	Calcium Formiate powder	
20'	0.25	Sodium Bicarbonate 1:10	float pH 4.8
10'	300.0	Water 35°C, drain	
		No water	
	2.0)	Oliner 77	
10'	0.5)	Pellan S 1:4 hot diss.	
30'	4.0	Relugan RE	
	4.0)	Tanigan LD	
120'	4.0)	Mimosa	
10'	300.0	Water at 55°C	pH 4.8
20'	1.0	Migrosine 1:20 diss.	
	(4.0	Oliner 77	
60'	(0.5	Pellan S	
	(0.5	Oliner ML	
	1.0	Formic Acid 1:5 diss.	pH 3.8
	5.0)	Chrome liquor No. III	
60'	0.3	Sodium Bicarbonate	pH 3.6
10'	300.0	Water wash cold drain	
10'		Rinse cold	

ITEM 27 :

TRIAL NO. 9

PROCESSING OF COW HIDES FOR BLACK CRUST/
ARMY BLACK/SMOOTH GRAIN

DATE : 27.12.84

(New Tanning with Reduced liquor)

After Tanning pH 3.6

Shaving weight (19 kg) 10% = 17.000 kg

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water, wash, drain	
	(150.0	Water cold	
10'	(0.4	Sodium bicarbonate	
	(0.2	Calcium Formate	
5'	1.0	Olinor 77	
20'	1.0	Basyntan D powder	float pH 5.0
10'		Rinse	
	100.0	Water, cold	
20'	1/2	Fatliquor	
30'	3.5	Relugan EE	
	2.0)	Pellutax ZND	
30'	4.0)	Mimosa	start heating
5'	150.0	Water, 55°C	
15'	1.0	Nigrosine	
45'	2/3	Fatliquor	pH 4.2
3x 10'	0.25	Formic Acid 1:5	pH 3.6
	(0.5	Lipamin liquor NO	
20'	(0.01	Garmin K	pH 3.8
10'		Rinse cold	
		<u>Fatliquor combination</u>	
	5.0	Olinor 77	
	0.5	Pellan 8	
	0.5	Olinor iL	

ITEM 28 :

TRIAL NO. 10

PROCESSING OF COW HIDES : RETANNING BLACK
"EUG GRAIN" NEUTRALIZATION WITH SODIUM FORMIATE

DATE : 28.12.84

(New tanning for black leather with reduced chrome)

Thickness - 1.7 - 1.8 m.m.

Shaved weight - 17.3 kg.

TIME	%	PRODUCTS	REMARKS
			After tanning pH 3.1
<u>27.12.84</u>	200.0	Water cold	
	1.0	Neutrigan P ⁴ (sodium formiate)	Stop overnight
	150.0	Water	
	(0.4	Sodium Bicarbonate	
10'	(0.2	Neutrigan P ⁴	
5'	1.0	Olinor 77	
20'	1.5	Tanigan QF	pH float : 4.4 pH cut : green
10'		Rince, cold	
	100.0	Water, cold	
20'	½	Fatliquor	
30'	3.5	Relugan RE	
	2.0)	Pellutax END	
45'	4.0)	Mimosa	heat up
	150.0	Water 55°C	
10'	0.4	Nigrosine	
45'	2/3	Fatliquor	
5'	0.25	Formic Acid 1:5	
10'	0.6	Nigrosine	pH 3.6
	(0.5	Lipamin liquor NO	
20'	(0.01	Garmin K	pH 3.8
10'		Rince cold	
		<u>Fatliquor Combination</u>	
	5	Olinor 77	
	0.5	Pellan S	
	0.5	Olinor NL	

ITEM 29 :

2 TRIALS : 10 AREDUCTION OF CHROME LIQUORS (Na₂Cr₂O₇)

			I	II	III
			33%	38%	49%
Basicity					
WATER	2 PARTS	I	336	336	336
Na ₂ Cr ₂ O ₇	1 PART	II			
H ₂ SO ₄ cons (66°Be)		III	346	36	291
Chrome Shavings		IV	50	50	-
Hypo		V	10	10	21
GURR (sugar) Brown sugar)	dissolved		46	43	60
from sugar cane	) slowly added				

Check up if reduction is completed, if completed, cool down overnight, filter with cotton waste or jute bags in pit, make up to 40°Be with water :

If more concentrated liquors are required, the same calculation can be done with 42-50°Be

Calculation of Cr₂O₃ content :

336 lbs. Na₂Cr₂O₇ 50% Cr₂O₃ contain = 168 lbs Cr₂O₃
 + Water to make up 40°Be = 525 litre
 168 lbs Cr₂O₃ in 525 litre = 3.2 lbs. Cr₂O₃ in
 10 litre liquor
 or Cr₂O₃ 0.32 lbs in 1 litre liquor

Before using the liquor, store for a few days or as long as possible for oleation.

(If chrome shavings are used the liquor should be filtered before use.)

As Na₂Cr₂O₇ is hygroscopic, the weight should be taken immediately after opening of the drums.

ITEM 30 :

TRIAL NO. 11

PROCESSING OF COW HIDE - RETANNING NATURAL CRUST

DATE : 3.1.85

QUANTITY : 5 sides
 shaved - 1.7 - 1.8 mm
 shaved weight 12.5 kg

TIME	%	PRODUCTS	REMARKS
10'		Water, cold	
	(150.0	Water, 35°C	
10'	(0.5	Lipoderm liquor IC	
	(2.0	Calcium Formiate	
10'	{ 0.3	Sodium Bicarbonate	
30'	2.0	Tanigan PR	float pH 4.5
10'		Wash 60°C	pH cut : Greenish-blue
	(150.0	Wash, 60°C	
40'	(3.5	Relugan RE	
	(1.5	Lipoderm liquor IC	
30'	(1.5	Olinor 77	
	(0.5	Pellan S	
	4.0)	Mimosa	
30'	2.0)	Pellutax ZND	
10'	0.4	Nigrosine	
	2.0)	Olinor 77	
30')		
	0.5)	Pellan S	pH 4.2
5'	0.25	Formic Acid 1:5	
10'	0.6	Nigrosine	pH 3.6
	(0.5	Lipamin liquor NO	
20'	(
	(0.01	Garmin K	pH 3.8
10'		Rinse cold	

ITEM 31 :

TRIAL NO. 12

PROCESSING OF COW HIDE - RETANNING
BLACK SOFT SHOE UPPERS

DATE : 10.1.85

(New tanning, heavy hides)
Thickness - 1.7 - 1.8 mm
Shaved weight - 10%

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water, wash, 35°C	Drain
	100.0)	Water, 35°C	
15'	2.0)	Tanigan PR	
	1.0	Olinor 77 1:4 hot diss.	
45'	2.0	Calcium Formiate powder	
20'	0.75	Sodium Bicarbonate	float pH 4.9 cut pH blue
10'	300.0	Water, wash 35°C	Drain
		No water	
	2.0)	Olinor 77)	
10'	0.5)	Pellan S) 1:4 hot diss.	
30'	4.0	Relugan RE	
	(4.0	Tanigan LD	
120'	(4.0	Mimosa	
10'	300.0	Water at 55°C	
20'	0.4	Nigrosine 1:20 diss.	
	1.0)	Lipoderis liquor 1C)	
	4.0)	Olinor 77)	
60'	0.5)	Pellan S) 1:4 hot diss.	
	0.5	Olinor NL)	pH 4.3
15'	0.5	Formic Acid 1:5	pH 3.7
20'	0.6	Nigrosine	
	(2.0	Chromosal B	
60'	(0.3	Socium Bicarbonate	pH 3.8
10'	300.0	Water, wash, cold	Drain
10'		Rinse cold	

ITEM 32 :

TRIAL NO. 13

PROCESSING OF COW HIDE - RETANNING
FOR NATURAL CRUST

DATE : 11.1.85

QUANTITY : 5 pcs of light cow
Thickness 1.5 mm
Shaved weight 10%

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water, wash, 35°C	Drain
	100.0)	Water, 35°C	
15'	2.0)	Tanigan PR	
	1.0)	Lipoderu liquor IC 1:4 hot diss.	
45'	2.0	Calcium formiate	
20'	0.75	Sodium Bicarbonate	pH 4.4 float pH : 5.0
			10 blue) cut pH :80 yellow) 10 blue)
10'	300.0	Water, wash, 35°C	drain
		no water	
	(1.5	Lipoderu liquor IC	
10'	(1.5	Olinor 77 1:4 hot diss.	
	(0.5	Pellan S	
30'	4.0	Relugan RE	
	4.0)	Tanigan LD	
120'	4.0)	Mimosa	
10'	300.0	Water at 55°C	
	(1.0	Lipoderu liquor IC	
	(4.0	Olinor 77	
60'	(0.5	Pellan S	pH 4.3
	(0.5	Olinor ML	
15'	1.0	Formic Acid 1:5	pH 3.7
	2.0)	Chromosal B	
60'	0.3)	Sodium Bicarbonate	pH 3.8
10'	300.0	Water, wash. cold	drain
10'		Rinse cold	

ITEM 33 :

TRIAL NO. 6 B-1

PROCESSING OF GOAT SKINS FOR GARMENT SUEDE

DATE : 3.1.85

QUANTITY : 10 skins (6B)
 shaved 0.6 mm
 shaved weight

TIME	%	PRODUCTS	REMARKS
(Before : 2 days liming & 2 days reliming & Oropon from the beginning)			
	200.0	Water 50°C	
30'	0.5	Amollan S (1:5 diss.) 50°C water	Drain Float
	6.0	Chrome powder	
	0.3)	Sodium Bicarbonate	
3 hrs	4.0)	Lutan B	
	1.0	Immergan A 1:5	
	100.0	Water 40°C	
	2.5	Sodium Bicarbonate powder	
	2.0	Neutrigan P4	
		Wash or rinse at 50°C	pH 5.3 Drain
(	50.0	Water 50°C	
45' (	5.0	Lipoderm liquor IC	
(	1.0	Pellan S	pH 5.0
2 x 10'	0.5	Formic Acid 1:5	pH 3.8
		Wash or rinse cold	
		hang dry, stake by hand	
		milling 1 hr. Buff on suede side	
		- dry weight	

ITEM 33 (continued)

TRIAL NO. 6 B-1

QUANTITY : 10 goat skins

DATE 8.1.85

Dry weight
Thickness 0.6 mm

TIME	%	PRODUCTS	REMARKS
	500.0	Water 40°C	
	0.5	Amollan A conc.	
60'	1.0	Ammonia liq.	
		Wash or rinse 30°C	
	100.0	Water 30°C	
5'	1.0	Ammonia liq.	
30'	8.0	Dye powder	Warm up
		Sella fast Brown	
10'	150.0	Water 50°C	
	(11.0	Lipoderm liquor IC)	
60'	(0.5	Pellan S) 1:4 diss.	
	1.0	Olinor NL)	pH 5.3
3 x 10'	0.5	Formic Acid 1:5	
			pH 4.5
30'	1.0	Chrome powder	
			pH 3.8
20'	1.0	Lipamin liquor NO	
			pH 4.0
10'		Rinse cold	
		Worse up overnight	
		Hang dry, slowly without heat	
		Stake, mill, toggle, brush	

ITEM 34 :

TRIAL NO. 14

PROCESSING OF COW HIDES FOR FOOTBALL LEATHERDATE : 12.1.85
SaturdayQUANTITY : 2 butts, 6 pieces
(from heavy hides)
(1st Trial)Pelt weight 17.3 kg
1 day liming, flesh,
scudd, 1 night in water

TIME	%	PRODUCTS	REMARKS
10'		Rinse cold	
	200.0)	Water	
	1.0)	Ammonium Sulphate	
60'	0.5)	Sodium Bisulphite	
	0.5)	Decalcal N	
20'	0.2	Oropon OR	lime check fully delimed pH 8.5
10'		Rinse cold	
	60.0	Water)	
5'	8.0	Salt) check to 7.0	
2 hrs	1.0	Hcl 1:10 - 3 x 15'	pH 2.8 stop overnight
		next morning	pH 4.4 - check
2 hrs	0.6	Hcl 1:10	
		next morning check	pH 2.8
		drain 50% pickle float	
5 hrs	7.0	Chromosal B powder	check full penetration stop overnight pH 2.5
1 hr	60.0	Water	
1 hr	1.5	Sodium Bicarbonate 1:10	
			pH 3.8
		Horse up, pile till Friday	
		Sam, split 3.5 - 3.6 mm	
		shave to 3.0 mm	

ITEM 34 (contd.)

TRIAL NO. 14

QUANTITY : 6 pcs.

DATE : 23.1.85

3.8 split
shave 3 mm
shaved weight 8 kg.

TIME	%	PRODUCTS	REMARKS
10'		Wash, cold	
	(50.0	Water	
30'	(5.0	Chromosal B	
	(0.3	Na HCO ₃ powder	
30'	1.0	Lipacin liquor NO	pH 3.5
30'		Na HCO ₃ 1:10	pH 4 - 4.2
			pile over night
10'		Wash cold	
		no float	
	(2.0	Calcium Formate	
15'	(0.5	Na HCO ₃	
15'	1.0	Lipoderm liquor IC	
15'	2.5	Tanigan PR	pH 6
15'	3.0	Lipoderm liquor IC	
	3.0)	Tanigan QF	
20'	3.0)	Mimosa	
15'	3.0	Mimosa	
60'	200.0	Water 45°C	pH 4.8
2x 10'	300.0	Wash, cold, drain	
	50.0	Water 30°C	
	(1.2	Yellow Dye (Luganil yellow NGG)	
20'	(	) diss. hot	
	(0.5	Orange (Luganil orange OGC)	
	3.0	Lipoderm IC	
	4.0)	Olinor 77 emulsify	
45'	1.0)	Olinor NL	pH 5
30'	0.4	Formic Acid 1:10, 3 x 10'	pH 3.8
10'		Rinse cold	
		If finishing no cat.	
		No finishing - 2% NO	

ITEM 35 :

TRIAL No. 15

PROCESSING OF GOAT SKIN FOR GARMENT SUEDE

DATE : 14.1.85

QUANTITY : 10 goat skins, medium size

1 day liming/1 day reliming (normal process)

+ 2 days reliming Pelt weight 45 lb. = 20.5 kg

TIME	%	PRODUCTS	REMARKS
		Reliming	
	150.0	Water	
	2.0	Line	leave 2 days overnight
20'	100.0	Water (wash)	drain
20'	100.0	Water (wash)	drain
		Deliming	
	(80.0	Water at 35°C	
	(1.0	Decaltal N powder	
210'	(0.5	Ammonium Sulphate	
	(11.5	Oropon OR	
	(0.5	Bascal S	End pH 7.5
			check delimed with phenolphthalein (as colourless)
30'	300.0	Water (wash)	drain
		Pickling & tanning	
	40.0	Water	
15'	8.0	Salt	Check Be
	0.4	Formic Acid	dil. 1:20
120'	0.5	Sulphuric acid	End pH 3.0
		Drain 50% of pickle bath	
150'	7.0	Chrome powder	
30'	40.0	Water at 38 - 40°C	check penetration
120'	1.5	Sodium Bicarbonate	End pH 3.8

ITEM 36 :PROCESSING OF GOAT SKINS FOR GARMENT SUEDE

TRIAL NO. 15 A

DATE : 27.1.85

QUANTITY : 10 skins
 shaving 0.8
 shaved weight 6 kg.

TIME	%	PRODUCTS	REMARKS
		2 days liming + 2 days reliming Oropon from the beginning	
	200.0)	Water 50°C	
30'	0.5)	Degreasing Agent 1:5 50°C Amollan S	
10'		Drain No water	
	(6.0	Chromozal B	
3 hrs.	(0.3	Na HCO ₃ powder	
	(8.0	Lutan B	pH 3.7
	100.0	Water 40°C	
	2.5	Sodium Bicarbonate	
90'	2.0	Neutrigan P4 Drain	pH 5.0
10'		Wash or rinse at 50°C Drain	
	50.0	Water 50°C	
	2.0)	Lipoderm liquor IC	
45'	2.0)	Olinor 77	
	1.0)	Pellan S	
30'	0.5	Formic Acid 1:5	pH 4.0
		Wash or rinse cold (horse up overnight) hang dry stake, mill, buff suede side - Dry weight -	

ITEM 36 (continued)

TRIAL NO. 15 A

QUANTITY : 10 pcs. (Red Brownish colour)

DATE : 24.1.85

Dried weight 4 lbs. 12. oz = 2.16 kg

Thickness 0.8 mm

TIME	%	PRODUCTS	REMARKS
	500.0)	Water at 40 - 50°C	
60'	0.5)	Amollan A	
	1.0)	Ammonia (liq.)	
		Wash (or) Rinse cold 30°C	
	(100.0	Water at 30°C	
5'	(1.0	Ammonia (liq.)	
	7.0)	Lugnil Brown)	
	)	) 1:4 diss. at 60°C water	
30'	1.0)	Red NG)	
	(150.0	Water at 50°C	
	(11.0	Lipoderm liquor IC	
60'	(0.5	Pellan S 1:4 diss. at 60°C	
	(1.0	Olinor NL	check pH 5.2
30'	0.5	Formic Acid	
	1.0)	Chromosal B	
20'	1.0)	Lipamin liquor NO	
			check pH 4
10'		Rinse cold	
		Hoarse up overnight	
		hang dry	
		stake, mill, toggle	
		brush	

ITEM 37 :

TRIAL No. 16

PROCESSING OF COW HIDES FOR NATURAL CRUST
HEAVY COW HIDES

DATE : 16.1.85

QUANTITY : 5 sides
 thickness 1.7 - 1.8 mm
 shave weight 33 lb = 15 kg. - 10% = 13.5 kg

TIME	%	PRODUCTS	REMARKS
10'	300.0	water, wash, 35°C	drain
	100.0)	Water 35°C	
15'	2.0)	Tanigan PR	
	1.0)	Lipodera liquor IC 1:4 hot diss.	
45'	2.0	Calcium formate	
20'	0.25	Sodium Bicarbonate	float pH 5.0
10'	300.0	Water, wash 35°C	drain
		no water	
	1.5	Lipodera liquor IC	
	(1.5	Olinor 77 } 1:4 hot diss.	
10'	(0.5	Pellan S }	
30'	4.0	Relugan RE	
	4.0)	Tanigan LD	
120'	4.0)	Mimosa	
10'	300.0	Water at 55°C	pH 4.6
	(4.0	Olinor 77	
60'	(0.5	Pellan S	
	(0.5	Olinor NL	pH 4.3
15'	0.5	Formic Acid 1:5	pH 3.7
	2.0)	Chromosal B	
60'	0.3)	Sodium Bicarbonate	pH 3.8
10'	300.0	Water, wasy, cold	drain
10'		Rinse cold	

ITLM 38 :

TRIAL NO. 5 D

PROCESSING OF COB HIDES : OLD STOCK
 RECHROMED, RETAINED

DATE : 17.1.85

QUANTITY : 6 hides

1.7 - 1.8 mm as Trial No. 12

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water, wash, 35°C	drain
	100.0)	Water 35°C	
	2.0)	Tanigan PR	
15'	1.0)	Lipoderm liquor IC	
	1.0)	Olinor 77 1:4 hot diss.	
45'	1.0	Calcium Formiate	
20'	0.5	Sodium Bicarbonate	float pH 5.3 cut pH blue
10'	300.0	Water, wash, 35°C	drain
		no water	
	(1.5	Liquor IC)	
10'	(1.5	Olinor 77) 1:4 hot	
	(0.5	Pellan S	
30'	1.0	Relugan RE	
	1.0)	Tanigan LD	
120'	4.0)	Mimosa	
10'	300.0	Water at 35°C	
20'	0.4	Nigrosine 1:20	
	(4.0	Olinor 77)	
60'	(0.5	Pellan S)	
	(0.5	Olinor NL	pH 4.5
15'	0.5	Formic acid 1:5	pH 3.7
20'	0.6	Nigrosine	
	2.0)	Chromosal B	
60'	0.3	Sodium Bicarbonate	pH 3.8
10'	300.0	Water, wash cold, drain	
		Rinse cold	

ITEM 39 :TRIAL NO. 17PROCESSING OF COW HIDES FOR LIGHT COLOUR CRUST

DATE : 30.1.85

QUANTITY : 5 pcs. of light cow hides

thickness 1.5 mm

shaved weight 15.7 kg

Very good result

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water, wash 35°C	drain
	100.0)	Water 35°C	
15'	2.0)	Tanigan PR	
	1.0	Lipoderm liquor IC 1:4 hot diss.	
45'	2.0	Calcium formate	
20'	0.35	Sodium Bicarbonate	float pH 5.2 cut pH
10'	300.0	Water wash 35°C no water	drain
	1.5	Lipoderm liquor IC	
10'	1.5	Olinor 77	1:4 hot diss.
	0.5	Pellan S	
	(4.0	Relugan RE	
30'	(1.0	Relugan C	
	1.0)	Mimosa	
30'	2.0)	Tanigan LD	
	(2.0	Pellutax SWLF	
90'	(2.0	Easyntan D	
10'	300.0	Water at 55°C	
	1.0)	Lipoderm liquor IC	
	4.0)	Olinor 77	
60'	0.5)	Pellan S	
	0.5)	Olinor ML	pH 4.8
15'	1.0	Formic Acid 1:5	pH 3.7
	2.0)	Chromosal B	
60'	0.3)	Sodium Bicarbonate	pH 3.8
10'	300.0	Water, wash cold	drain
10'		Rinse cold	

ITEM 40 :

TRIAL 1 B
(Second Trial)PROCESSING OF GOAT SKIN FOR SHOE UPPER LEATHERQUANTITY : 20 pcs
thickness 1.2 mm
shaved weight 14.2 kg

DATE : 18.1.85

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water, wash cold	drain
	100.0)	Water add	
10'	1.0)	Calcium formate	
50'	0.6	Sodium Bicarbonate	pH float 5.7
			cut blue
10'	300.0	Water, wash	drain
	(80.0	Water cold	
15'	(2.0	Olinor 77	
	(0.5	Pellan S	
10'	2.0	Basyntan D powder	
30'	3.0	Mimosa	
20'	2.0	Relugan RE	start temp.
20'	0.6	Nigrosine (dil. 1:10)	
	3.0)	Olinor 77	
45'	0.5)	Pellan S	emulsified
	0.5)	Olinor NL	
10'	150.0	Water at 50°C	pH 4.8
5'	0.4	Formic Acid	
20'	0.4	Nigrosine (dil 1:10)	
5'	0.1	Formic Acid	pH 3.7
15'	0.5	Lipasin liquor NO	pH 3.9
10'		Rinse cold	

ITEM 41 :PROCESSING OF SHEEPSKIN FOR BOXING GLOVETRIAL No. 7 B
(Second Trial)

DATE : 19.1.85

QUANTITY : 10 skins (wet blue from
set section)
thickness = 1 - 1.2 mm
lining leather (black)
shaved weight - 5.3 kg.

TIME	%	PRODUCTS	
10'	300.0	Water, wash, cold	drain
	200.0)	Water 50°C	
30'	1.0)	Amollan S 1:5 50°C	water, drain
	(150.0	Water 35°C	
	(1.0	Olinor 77	
30'	(1.0	Basyntan MN	
	(1.0	Calcium Formiate	
40'	0.6	Sodium Bicarbonate (1:10)	float pH 6.4 cut pH
10'	300.0	Water, wash, cold	drain
	100.0)	Water	
15'	1.0)	Basyntan MN	
	1.0)	Ammonia	
30'	0.5	Nigrosine	full penetration
10'	150.0	Water 55°C	
	(6.0	Olinor 77	
30'	(0.5	Pellan S	pH 6.7
5'	0.3	Formic Acid 1:5	
30'	0.5	Nigrosine	
	5.0)	Olinor 77	
40'	0.5)	Pellan S	
	1.0)	Olinor NL	pH 5.5
30'	0.5	Formic Acid 1:5 3 x 10'	
20'	1.0	Lipamin liquor NO	pH 3.8
10'		Rinse	

PROCESSED BY CATSKIN HIDES FOR NATURAL CRUST (LIGHT) COW HIDE

DATE: 29.1.85

Thickness 1.5 m/m

Shaved weight 11 kgs

5 pcs of light cow

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water wash 35°C	Drain
15'	100.0) 2.0) 1.0)	Water 35°C Tanigan PR Lipoderm liq. 1C 1:4 hot disc	
45'	2.0	Calcium Formate	
20'	0.35	Sodium Bicarbonate	float pH 5.0 cut pH
10'	300.0	Water wash 35°C no water	
10'	1.5) 1.5) 0.5)	Lipoderm liq. 1C Olinor 77 Pellan S	1.4 hot disc
30'	4.0	Relugan RE	
20'	4.0) 4.0)	Tanigan LD Mimosa	
10'	300.0	Water at 55°C	
60'	1.0) 4.0) 0.5) 0.5)	Lipoderm liq. 1C Olinor 77 Pellan S Olinor NL	pH 4.4
15'	1.0	Formic Acid 1:5 disc	pH 3.8
60'	2.0) 0.3)	Chromosal B Sodium Bicarbonate	pH 3.9
10'	300.0	Water wash cold	Drain
10'		Rinse cold	

PROCESSING OF LIGHT COLOUR CRUST

DATE: 1.2.85

5 sides heavy cov

Thickness 1.8 mm

Shaved wt. 17.8 kgs - 10% - 16 kgs

Wet blue from test lot 608 (wet section)

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water wash 35°C	Drain
15'	100.0) 2.0) 1.0)	Water 35°C Tanigan PR Lipoderm liq. 1C 1:4 hot disc	
45'	2.0	Calcium Formate	
20'	0.5	Sodium Bicarbonate	float pH 5.0 cut pH dark green
10'	300.0	Water wash 35°C No water	Drain
10'	1.5) 1.5) 0.5)	Lipoderm liq. 1C Olinor 77 Pellan S	1:4 hot disc
30'	4.0) 1.0)	Relugen E Relugen C	
30'	1.0) 2.0)	Mimosa Tanigan LD	
90'	2.0) 2.0)	Pellutax SWLF Basyntan D	
10'	300.0	Water at 55°C	
60'	1.0) 4.0) 0.5) 0.5)	Lipoderm liq. 1C Olinor 77 Pellan S Olinor NL	pH 4.6
15'	1.0	Formic acid 1:5 disc	pH 3.8
60'	2.0) 0.3)	Chromosal B Sodium Bicarbonate	pH 3.8
10'	300	Water wash cold	Drain
10'		Rinse cold	

TANNING OF BLACK CRUST (HEAVY) COW HIDES

DATE: 4.2.85

Thickness

Shaved wt. 22.7 kgs - 10% = 20.5 kgs

5 sides of heavy hides

wet blue from test lot 608 (wet section)

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water wash 35°C	Drain
	100.0)	Water 35°C	
15'	2.0)	Tanigan PR	
	1.0)	Lipoderm liq. 1°C	1:4 hot disc
45'	2.0	Calcium Formate	
20'	0.5	Sodium Bicarbonate	
			float pH 5.0
			cut pH 10 green
			80 blue
			10 green
10'	300.0	Water wash 35°C	Drain
		No water	
	1.5)	Lipoderm liq. 1°C	
10'	1.5)	Olinor 77	1:4 hot disc
	0.5)	Pellan S	
30'	4.0	Relugan RE	
	4.0)	Tanigan LD	
120'	4.0)	Mimosa	
10'	300.0	Water at 55°C	
20'	0.6	Nigrosine	
	1.0)	Lipoderm liq. 1°C	
	4.0)	Olinor 77	
60'	0.5)	Pellan S	
	0.5)	Olinor ML	pH 4.6
15'	1.0	Formic acid 1:5 disc	pH 3.8
10'	0.4	Nigrosine	
	2.0)	Chromosal B	
60'	0.3)	Sodium Bicarbonate	
			pH 3.8
10'	300.0	Water wash cold	Drain
10'		Rinse	

PROCESSING OF CATTLEHIDES/GOAT SKIN FOR SHOE UPPER LEATHER (light colour)

10 pcs

DATE: 6.2.85

Thickness 1.2 mm

Shaved wt. 10 kgs

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water wash cold Drain	
10'	100.0) 1.0)	Water cold Calcium Formate	
50'	0.6	Sodium Bicarbonate	pH float 5.6 cut blue
10'	300.0	Water wash	Drain
15'	80.0) 3.0) 0.5)	Water cold Olinor 77 Pellan S	
20'	2.5	Relugan RE	
20'	2.5	Pellutax SWLF	
10'	150.	Water 50°C	
45'	3.0) 0.5) 1.0)	Olinor 77 Pellan S Olinor NL	pH 5.2
10'	0.8	Formic Acid	pH 3.8
15'	1.0	Tanigan LD OR 3LN	pH 3.9
10'		Rinse cold	

PROCESSING OF OX/DON FOR BEST BELTING LEATHER

DATE: : 19.2.85

QUANTITY: 5 sides of (heavy hides)

Thickness 2.5 mm

Shaving wt. 13.6 kg - 10% = 12.3 kgs

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water wash cold drain	
15'	100.0)	Water cold	
	2.0)	Calcium Formate	
	0.5)	Sodium Bicarbonate pH 5.0	
15'	1.0	Lipoderm liquor 1C	
15'	2.5	Tanigan PR	pH 5.6
15'	3.0	Lipoderm liquor 1C	
15'	2.0	Relugan R7	
20'	3.0)	Tanigan LD (QF/OS or Neosyn)	
	3.0)	Mimosa	
15'	3.0	Mimosa	pH 4.9 Drain
2x10	300.0	Water, wash, cold	Drain
30'	50.0)	Water cold	
	0.5)	Nigrosine full penetration	
10'	150.0	Water 55°C	
45'	3.0)	Lipoderm liquor 1C	
	4.0)	Olinor 77	
	1.0)	Olinor NL	pH 4.5
30'	0.3	Formic Acid 1:10 (3 x 10)	pH 3.8
40'	0.5	Nigrosine	
10'		Rinse cold	pH 4.0 Drain
		File 24 hrs	
		Wet stretching like football leather	

PREP. OF GARMENT LEATHER FROM GOAT SKIN

DATE: 18.2.85

QUANTITY 20 pcs of goat skin

Lot No.

Drum No. Thickness 1.0 mm

Page:

Shaved wt. 26 lbs = 11.8 kgs 10% = 10.6 kgs

Normal liming 1 day + 3 days Reliming

TIME	%	PRODUCTS	REMARKS
10'	300.0	Water wash cold	Drain
30'	150.0) 1.0) 2.0)	Water Olinor 77 Tanigan PR	
40'	0.6	Sodium Bicarbonate	float pH 6.4 cut pH blue
10'	300.0	Water wash cold	Drain
15'	100.0) 2.0) 2.0)	Water 35°C Tanol NNO Ammonia (liq)	
30'	0.3	Dye stuff dis 1:4	Dye stuff mixture 0.24 Derma Brown DR 0.26 Luganil Orange GGE
30'	6.0) 0.5)	Olinor 77 Pellan S	
10'	150.0	Water 50°C	pH 7.0
40'	5.0) 0.5) 1.0)	Olinor 77 Pellan S Olinor NL	pH 5.2
30'	1.25	Formic Acid	pH 4.0
10'		Rinse cold	drain

PROCESSING OF SMO- UPPER LEATHER

DATE: 18.2.85

QUANTITY: 6 sides heavy cow-hides

Lot No.

DRUM No. Thickness 1.8 m/m

Page:

Shaved wt. 20 kgs - 10% = 18 kgs

WET BLUE FROM NORMAL PRODUCTION

TIME	%	PRODUCTS	REMARKS
20'	200.0	Water wash cold	Drain
15'	100.0) 2.0) 1.0)	Water cold Tanigan PR Lipoderm liq. 10	
45'	2.0) 0.3)	Calcium Formate Sodium Bicarbonate	float pH 5.0 cut pH Green wish blue
10'	300.0	Water wash cold Retanning without float	Drain
15'	1.5) 1.5) 0.5)	Lipoderm liq. 10 Olinor 77 Pellans	1:4 hot dissolved
30'	3.4.0	Relugan RE	
60'	3.4.0) 3.4.0)	Tanigan LD Mimosa	
10'	200.0	Water 55°C	
45'	4.0) 0.5) 0.5)	Olinor 77 Pellan S Olinor NL	pH 4.6
5'	0.5	Formic Acid	pH 3.9
60'	2.0	Chrome powder	pH 3.8
20'	0.5	Nigrosine dye dissolved	pH 3.8
10'	300.0	Water wash cold drain	File 24 - 48 hrs.

Trial No. I (6.2.85)

Olinor NL (colour light orange)

Olinor NL 30 gm.

Olinor 77 180 gm

Lipoderm liquor 1C 30 gm

240 gm - mixed well 10'

Take 200 gm

mixed with 800 cc (warm water 60°C)
mixed well

15:00 - 15:02 (2') - start layer

15:15 15' - 30 cc clear oil solution

15:20 20' - 40 cc "

15:25 25' - 50 cc "

7.2.85

Morning 60 cc - clear oil solution layer

12 cc - milky layer

928 cc - emulsified layer

Trial No. II (6.2.85)

Perpristol U (colour light yellow)

Perpristol U 30 gm.

Olinor 77 180 gm.

Lipoderm liquor 1C 30 gm.

240 gm. mixed well 10'

Take 200 gm

mixed with 800 cc (warm water 60°C)
mixed well

15:00 - 15:10' (10) start layer 1 cc (clear oil)

15:00 - 16:30 (90) 10 cc clear oil layer

20 cc oil bubble layer

40 cc milky layer

930 cc emulsified layer

Trial No. V (8.2.85)

4% Olinor 77	160 gm
1% Lipoderm liquor 1C	40 gm
0.5% Pellan S	20 gm
0.5% Olinor NL	20 gm
	<hr/>
	240 gm mixed well 10'

Take 200 gm
 mixed with 800 cc (warm water 60°C)
 mixed well

15:05 - 16:05 (1 hr) not yet separated

9.2.85 morning

5 cc clear oil layer
 10 cc milky layer
 975 cc emulsified layer
 10 cc precipitated layer (bottom)

11.2.85 morning

10 cc vacant layer
 10 cc oil layer
 15 cc milky layer
 950 cc emulsified layer
 15 cc precipitated layer (bottom)

Trial No. VI (8.2.85)

4% Olinor 77	160 gm
1% Lipoderm liquor 1C	40 gm
0.5% Pellan S	20 gm
0.5% Perpristol U	20 gm
	<hr/>
	240 gm mixed well 10'

Take 200
 mixed with 800 cc (warm water 60°C)
 mixed well

13:10 - 16:05 2 hrs. 55' not yet separated

9.2.85 morning

5 cc clear oil layer
 10 cc milky layer
 975 cc emulsified layer
 10 cc precipitated layer (bottom)

11.2.85 morning

10 cc vacant layer
 10 cc clear oil layer
 20 cc milky layer
 945 cc emulsified layer
 15 cc precipitated layer (bottom)

Trial No. VII (8.2.85)

4% Olinor 77	160 gm
1% Lipoderm liquor 1C	40 gm
0.5% Pellan S	20 gm
1.0% Perpristol U	<u>40 gm</u>
	260 gm mixed well 10'

Take 200 gm
mixed with 800 cc (warm water 60°C)
mixed well

13:15 - 16:05 (2 hrs 50') not yet separated

9.2.85 morning

2 cc clear oil layer
10 cc milky layer
975 cc emulsified layer
10 cc precipitated layer (bottom)

11.2.85 morning

5 cc vacant layer
10 cc clear oil layer
20 cc milky layer
950 cc emulsified layer
15 cc precipitated layer (bottom)

Trial No. VIII (11.2.85)

4% Olinor 77	140 gm
1% Lipoderm liquor 1C	35 gm
0.75% Pellan "	26.25 gm
1% Olinor NL	<u>35 gm</u>
	236.25 gm mixed well 10'

Take 200 gm
mixed with 800 cc (warm water 60°C)
mixed well

4:30 - 7:00 p.m. not yet separated

13.2.85 morning

20 cc vacant layer
10 cc milky layer
970 cc emulsified layer

Trial No. IX (11.2.85)

4% Olinor 77	140 gm
1% Lipoderm liquor 1C	35 gm
0.75% Pellan S	26.25 gm
1% Perpristol U	<u>35 gm</u>
	236.25 gm mixed well 10'

Take 200 gm
mixed with 800 cc (warm water 60°C)
mixed well

4:35 - 7:00 p.m. 2 hrs 25' not yet separated

13.2.1985 morning

10 cc vacant layer
10 cc milky layer
980 cc emulsified layer

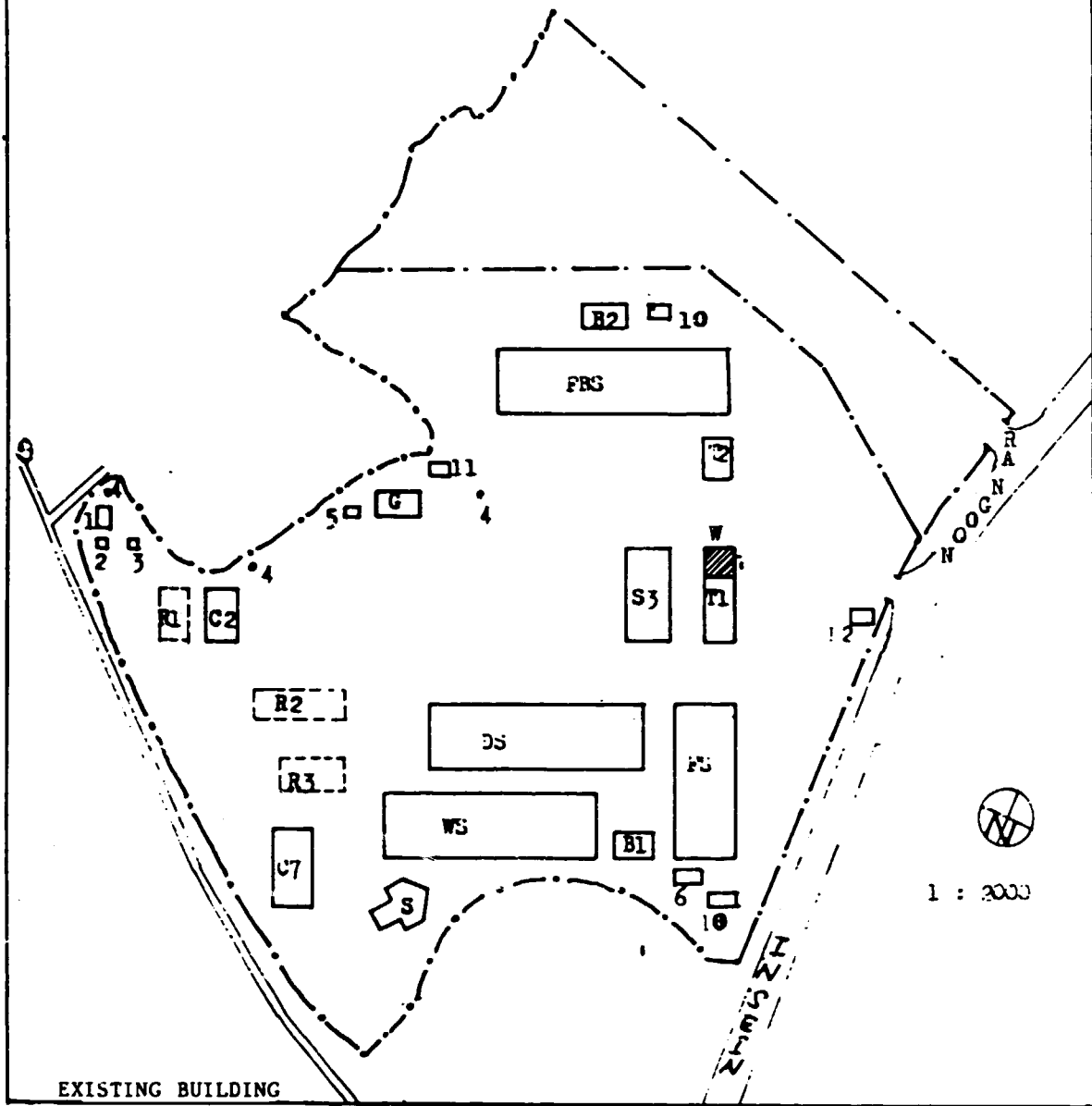
ANNEX 4

C O N T E N T S

Item

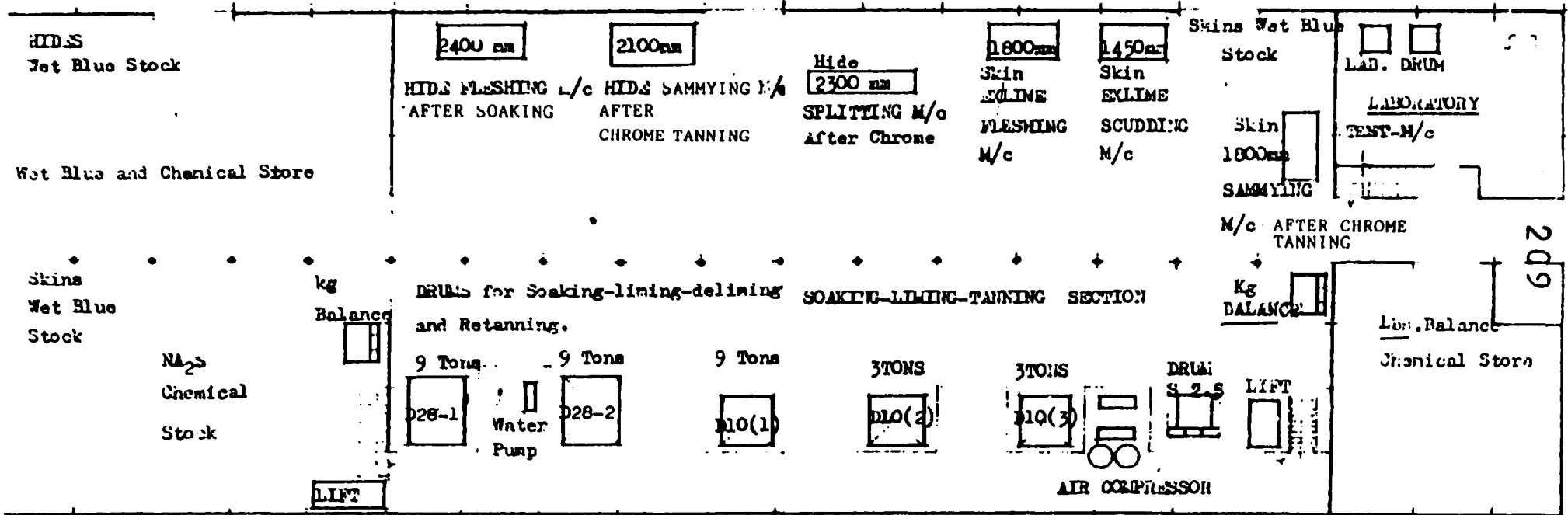
1. Layout Plan of LF (R) 1
2. Layout Plan of Lime Tan, Yard
3. Layout Plan of Drying Section
4. Layout Plan of Finishing Section
5. Flow Chart of Process

208
LEATHER FACTORY RANGOON NO. 1 LAYOUT PLAN AT PRESENT

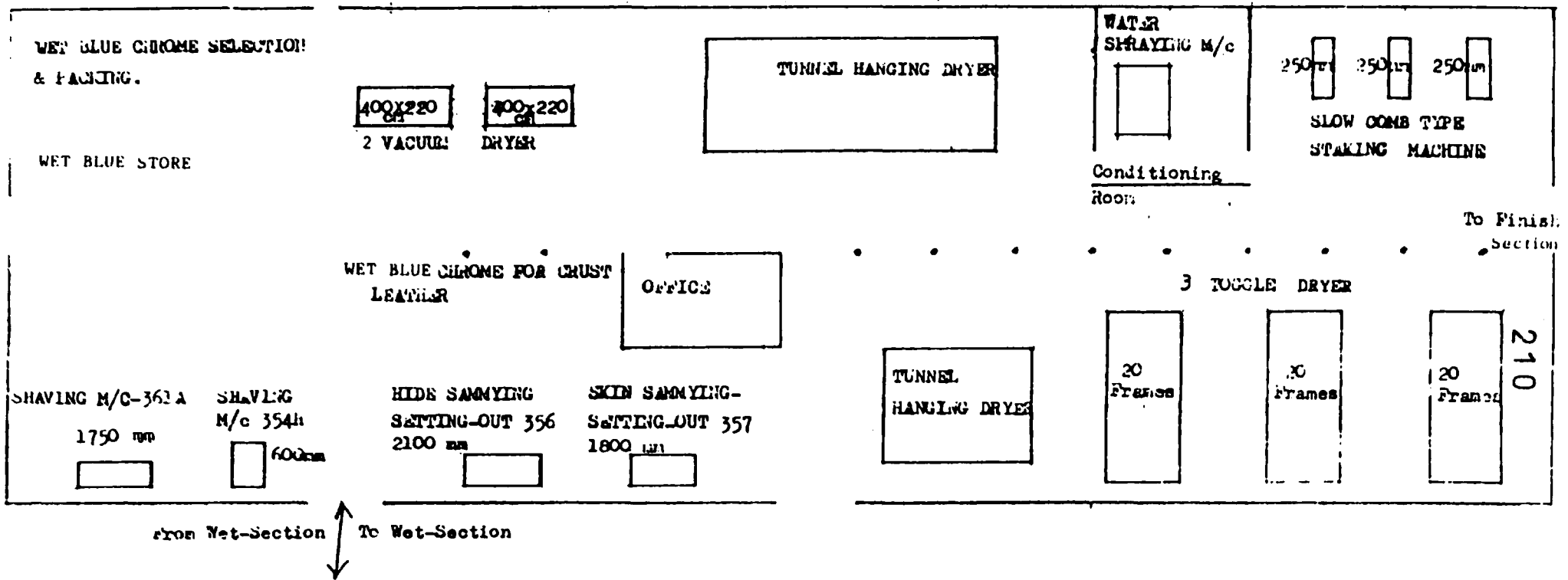


- | | |
|-------------------------------------|----------------------------------|
| WS - Wet Section 240' x 80' | 10 - F/O Tank 10,000 gals. |
| DS - Drying Section 240' x 80' | 11 - Over Head Tank 10,000 gals. |
| FS - Finishing Section 180' x 80' | 12 - Gate House |
| B1 - Boiler & Aircompressor House | R1 - Raw Hide Store (Temporary) |
| S - Sedimentation Tank | R2 - Raw Hide Store (Temporary) |
| G2 - Chemical Store 60'x40' | R3 - Raw Hide Store (Temporary) |
| C7 - Lime & Salt Store 90'x 40' | G - Ground Tank 60,000 gals. |
| S3 - Finished Goods Store 50'x100' | |
| T1 - Transformer House 6.6./ .42 KV | <u>UNDER CONSTRUCTION</u> |
| T2 - Transformer House 33/6.6 KV | W - Work Shop |
| FBS- Fiber Board Factory | |
| B2 - Boiler & Aircompressor House | |
| 1 - Surface Tank 10,000 gals | |
| 2,5- Pump & Compressor House | |
| 3 - Over Head Tank 5,000 gals | |
| 4 - 6" Tube Well - 3 Nos. | |

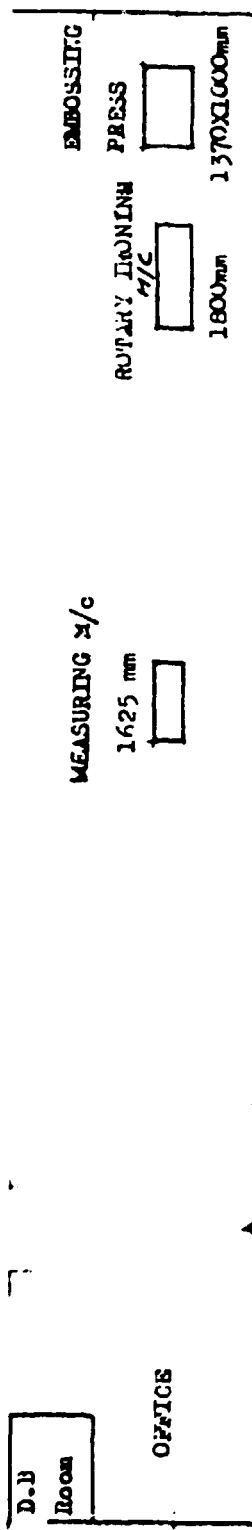
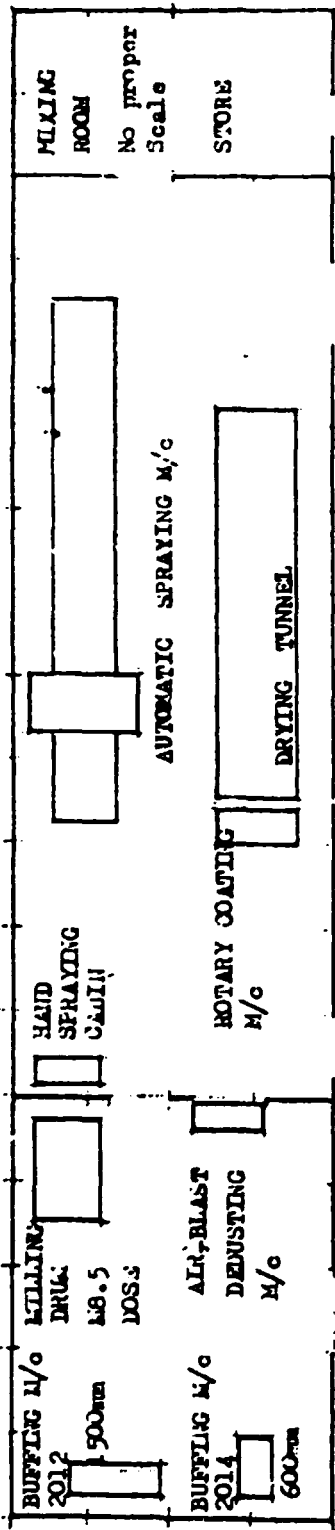
↑
To Drying
Section



FINDINGS:



FINDINGS:

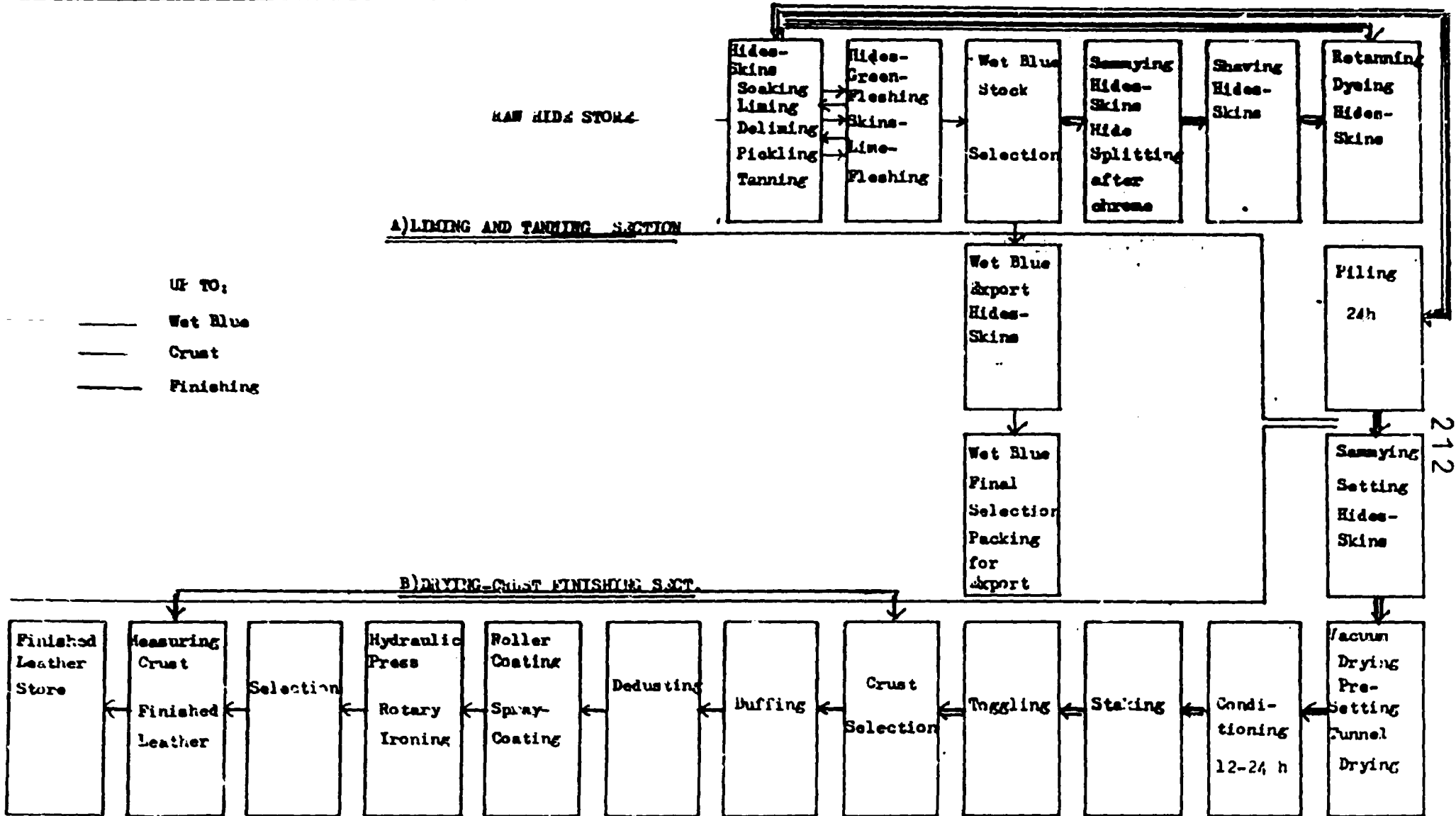


FINDINGS:-

PROCESS FLOW FOR HIDES AND SKINS

A) Liming and Tanning Section

B) Drying-Crust-Finishing Section



ANNEX 5

C O N T E N T

Item

1. Printed Booklet,
Export Products of
General Industry Corporation

EXPORT PRODUCTS
OF

GENERAL INDUSTRIES CORPORATION



MINISTRY OF No.(1) INDUSTRY
THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

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THE SOCIALIST REPUBLIC OF THE UNION OF BURMA
MINISTRY OF NO. (1) INDUSTRY
GENERAL INDUSTRIES CORPORATION
NO. 128/132, CRISP STREET
RANGOON, BURMA

Cable "GENINDUS"
Telex 21500 SAMATA BM
P.O. Box No. 50

PARTICULARS OF BURMESE RAW DUCK FEATHERS

1. Quality : Raw, Fresh and Sun-dried Quality.
Sand and Dust content not exceeding eight percent.
2. Packing : Hand Pressed bale in single gunny, about 275 to 300 lbs
per bale. Size of bale : 28 inches x 28 inches x 36 inches
3. Mode of Sale : Price per long ton or metric ton nett FOB Rangoon in
US Dollars basis.
4. Payment : By confirmed irrevocable Letter of Credit in U.S.
Dollars for 100% invoice value Payable at sight against
presentation of shipping documents.
5. Inspection : Weight, quality and conditions of packing shall be final
at the port of shipment as certified by M/S Inspection
and Agency Corporation, Rangoon.

THE SOCIALIST REPUBLIC OF THE UNION OF BURMA
 MINISTRY OF NO. (1) INDUSTRY
 GENERAL INDUSTRIES CORPORATION
 NO. 128/132, CRISP STREET
 RANGOON, BURMA.

Cable "GENINDUS"
 Telex 21500 SAMATA BM
 P.O. Box No. 50

INDUSTRIAL WORK GLOVES

1. Cow Split Leather Industrial Work Gloves
2. Buffalo Split Leather Industrial Work Gloves
3. Buffalo Grain Industrial Work Gloves

RUBBER BALLS

<u>Commodity</u>	<u>Circumference</u> (mm)	<u>Weight</u> (gm)
1. Foot ball	680-710	396-452
2. Volley ball	650-670	250-280
3. Basket ball	450-780	600-650
4. Child ball	530-560	250-310

SELECTION AND TERMS OF SALE ON
WET BLUE CHROME, CHROME RETANNED,
COLOUR KIDS AND VEGETABLE TANNED GOAT /
SHEEP LEATHER AND WET BLUE CHROME
OX, COW / BUFFALO LEATHER

- | | | |
|---|------------------|--|
| 1. WET BLUE CHROME
GOAT / SHEEP LEATHER | }
}
}
} | Selection 1/11/111 Grade 20/40/40
percent. Average size about 4 / 5
square feet per piece [i.e. Min: 3
square feet: Max: 7 square feet per
piece] |
| 2. CHROME RETANNED
GOAT/SHEEP LEATHER | | |
| 3. COLOUR KIDS
GOAT/SHEEP LEATHER | | |
| 4. VEGETABLE TANNED
GOAT / SHEEP LEATHER | | |
| 5. WET BLUE CHROME
OX / COW LEATHER | | Selection 1/11/111 Grade 20/40/40
percent. Average size about 10/15
square feet per side piece [i.e. Min:
8 square feet, Max: 18 square feet
per side piece] |
| 6. WET BLUE CHROME
BUFFALO LEATHER | | Selection 1/11 / 111 Grade 20/40/40
percent. Average size about 15/18
square feet per side piece [i.e. Min:
10 square feet Max: 25 square feet
side piece] |
| 7. PACKING | | Inner Polythene, Outer Jute Bags. |
| 8. PRICE TERMS | | Per square foot F.O.B. Rangoon in
U.S. Cents basis. |
| 9. PAYMENT T | | By confirmed Irrevocable Letter
of Credit for 100% Invoice value
payable at sight. |

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10. WEIGHT / QUALITY
INSPECTION

Weight/ Quantity/ Quality/ Measure-ment and conditions of packing shall be final at the Port of Loading as certified by the Inspection & Agency Corporation, Rangoon-Burma.

11. REMARKS

Quality specification of the mentioned Goat / Sheep and Ox Cow/ Buffalo leather are herewith attached for your guidance.

SPECIFICATION OF WET BLUE CHROME /
VEGETABLE TANNED / CHROME RETANNED /
COLOUR KID GOAT / SHEEP LEATHER

1st Quality

- | | |
|-------------------|--|
| 1. Shape | Standard Pattern. |
| 2. Colour | Uniform through out the entire skin. |
| 3. Cuts and holes | Free from cuts and holes in the butt and few in the belly and / or shoulder. |
| 4. Grain surface | Free from scars, scratches and abrasions in the butt and few in the belly and / or shoulder. |
| 5. Thickness | 1 mm \pm 0.25 mm |

2nd. Quality

- | | |
|-------------------|---|
| 1. Shape | Standard Pattern. |
| 2. Colour | Fairly uniform through out the entire skin. |
| 3. Cuts and holes | Fairly free from cuts and holes in the butt and few in the belly and / or shoulder. |
| 4. Grain surface | Few in the butt, belly and / or shoulder. |
| 5. Thickness | 1 mm \pm 0.25 mm |

(2)

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3 rd. Quality

- | | |
|-------------------|--|
| 1. Shape | Standard Pattern. |
| 2. Colour | Few uneven colour over the entire skin. |
| 3. Cuts and holes | Few holes and cuts in the butt, belly and / or shoulder. |
| 4. Grain surface | Few in the butt, belly and / or shoulder. |
| 5. Thickness | 1 mm \pm 0.25 mm |

SPECIFICATION OF WET BLUE CHROME

OX / COW AND BUFFALO LEATHER

1 st. Quality

- | | |
|-------------------|---|
| 1. Shape | Standard Pattern. |
| 2. Colour | Uniform through out the entire skin. |
| 3. Cuts and holes | Free from cuts and holes in the butt and few in the belly and / or shoulder. |
| 4. Grain surface | Free from scars scratches and abrasions in the butt and few in the belly and / or shoulder. |
| 5. Thickness | 2 to 4 mm |

2nd. Quality

- | | |
|-------------------|---|
| 1. Shape | Standard Pattern. |
| 2. Colour | Fairly uniform through out the entire skin. |
| 3. Cuts and holes | Fairly free from cuts and holes in the butt and few in the belly and / or shoulder. |
| 4. Grain surface | Few in the butt, belly and / or shoulder. |
| 5. Thickness | 2 to 4 mm |

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3rd. Quality

- | | |
|-------------------|--|
| 1. Shape | Standard Pattern. |
| 2. Colour | Few uneven colour over the entire skin. |
| 3. Cuts and holes | Few holes and cuts in the butt; belly and/or shoulder. |
| 4. Grain Surface | Few in the butt, belly and/or shoulder. |
| 5. Thickness | 2 to 4 mm |

SPECIFICATION OF DRY SALTED GOAT SKIN

1st. Quality

- | | |
|-------------------|---|
| 1. Shape | Standard Pattern. |
| 2. Cuts and holes | Free from cuts and holes in the belly and/or shoulder. |
| 3. Grain Surface | Free from scars scratches and abrasions in the butt and few in the belly and / or shoulder. |

2nd. Quality

- | | |
|-------------------|---|
| 1. Shape | Standard Pattern. |
| 2. Cuts and holes | Fairly free from cuts and holes in the butt and few in the belly and / or shoulder. |
| 3. Grain Surface | Fairly free from scars, scratches and abrasions in the butt and few in butt, belly and / or shoulder. |

- | | |
|--------------|---|
| Selection | : First / Second - 60% / 40% |
| Size | : 26 Inches and up [i. e. minimum size 26 inches] |
| Weight Range | : About 190/210 lbs per 100 pieces |

- Packing** : Jute cloth bundle [about 100 pieces per bundle]
- Price** : Per dozen or per piece F. O. B. Rangoon basis.
- Payment** : By confirmed Irrevocable letter of Credit for 100% Invoice value payable at sight.
- Inspection** : Weight/Quantity/Quality and condition of packing shall be final at the port of loading as certified by Inspection and Agency Corporation, Rangoon, Burma.

TERMS OF SALE ON WET SALTED

OX/COW AND BUFFALO HIDES

- OX / COW HIDES** : Range 25/35 lbs; average weight about 28/32 lbs per piece, Selection: First / Second 50/50 percent.
- : Range 35 lbs & up; average weight about 38/42 lbs per piece; Selection : First / Second 50/50 percent.
- BUFFALO HIDES** : Range 60/80 lbs; average weight about 65/75 lbs per piece; Selection: First / Second 60/40 percent.
- : Range 80 lbs & up, average weight about 85/95 lbs per piece. Selection : First / Second 60/40 percent.
- PACKING** : In single jute bags.
- PRICE** : Per lb F. O. B. Rangoon basis.
- PAYMENT** : By confirmed Irrevocable letter of credit for 100% Invoice value payable at sight.
- INSPECTION** : Weight and Quality to be final at the port of shipment by Inspection and Agency Corporation [i.e. Formerly Trade Corporation No. 21]
- REMARKS** : Quality specification of the Wet salted Hides is herewith attached for your guidance.

QUALITY SPECIFICATION OF THE WETSALTED HIDES

1st. Quality

1. Sound and fully cured.
2. Standard Pattern.
3. Free from deep cuts or holes in the butt and few in the belly and / or shoulder
4. Free from scars; scratches and abrasions, in the butt and few in the belly and / or shoulder.
5. Free from hair slips.

2nd: Quality

1. Sound and fully cured.
2. Standard Pattern.
3. One small deep cut or hole in the butt and few in the belly and / or shoulder.
4. One small scar or scratch or abrasion in the butt, and few in the belly and / or shoulder.
5. Free from hair slips.

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SALES CONTRACT FORM

GOVERNMENT OF THE SOCIALIST REPUBLIC OF
THE UNION OF BURMA
MINISTRY OF NO. (1) INDUSTRY
GENERAL INDUSTRIES CORPORATION
No. 128 / 132, CRISP STREET
RANOON, BURMA.

P. O. BOX No. 50.

TELEX No. : 21500 SAMATA BM

Ref : No.....

Cable : GENINDUS.

Dated

SALE CONTRACT No.

1. AS PER Agreement reached following discussion between of..... and officials of General Industries Corporation on
2. COMMODITY : Leathers, Average size about sq. ft. per piece.
3. QUALITY : Selection..... Gradepercent.
4. QUANTITY : pieces.
5. PRICE : per square foot F. O. B. Rangoon.
6. PACKING :
7. SHIPMENT :
8. DESTINATION :
9. PORT OF LOADING : RANGOON:
10. INSURANCE : To be covered by Buyers.

II. PAYMENT

[1] By confirmed Irrevocable Letter of Credit in US Dollars for 100% Invoice value payable at sight, without recourse for the full value of the goods, to be established immediately by the Buyers in favour of Sellers through a prime bank or correspondent bank of the Myanma Foreign Trade Bank, Rangoon. The Letter of Credit must be opened through the Myanma Foreign Trade Bank, Rangoon, authorising Payment by nett cash against presentation of shipping documents. The Letters of Credit shall provide for (a) Partial shipment allowed (b) Transshipment allowed.

[2] The Letter or Credit must also provide for the payment of Bank's Collection Commission Bills and other stamp duties, postage etc.

[3] Should the Buyers fail to open the Letter of Credit within TEN days after conclusion of business by exchange of cable or letters, and/or fail to fulfil the contract within the shipping period, Sellers shall have the right to cancel this contract and to claim from the Buyers all losses, including storage, handling etc. if any, sustained by the Sellers on resale of any unshipped balance.

[4] The mail copy of the original Letter of Credit must reach the Sellers at least 20 days before the earliest date by which shipment is required.

12. WEIGHING AND INSPECTION : Quality/Quantity/Weight and condition of packing shall be final at the port of loading, as certified by the Inspection and Agency Corporation. [I.e. Formerly Trade Corporation No. 21] whose Inspection fees will be charged to the Seller's account.
13. FORCE MAJEURE : The usual Force Mejeure conditions to apply.
14. ARBITRATION : All disputes shall be settled amicably, failing which, those shall be referred to Arbitration in Burma in accordance with the Laws of the Socialist Republic of the Union of Burma.
15. LAW OF PERFORMANCE : This contract shall be governed by the laws of the Socialisc Republic of the Union of Burma.

BUYERS

SELLERS

..... for GENERAL INDUSTRIES CORPORATION
.....

Please sign and return the duplicate of this contract for our records.
We thank you for this business.

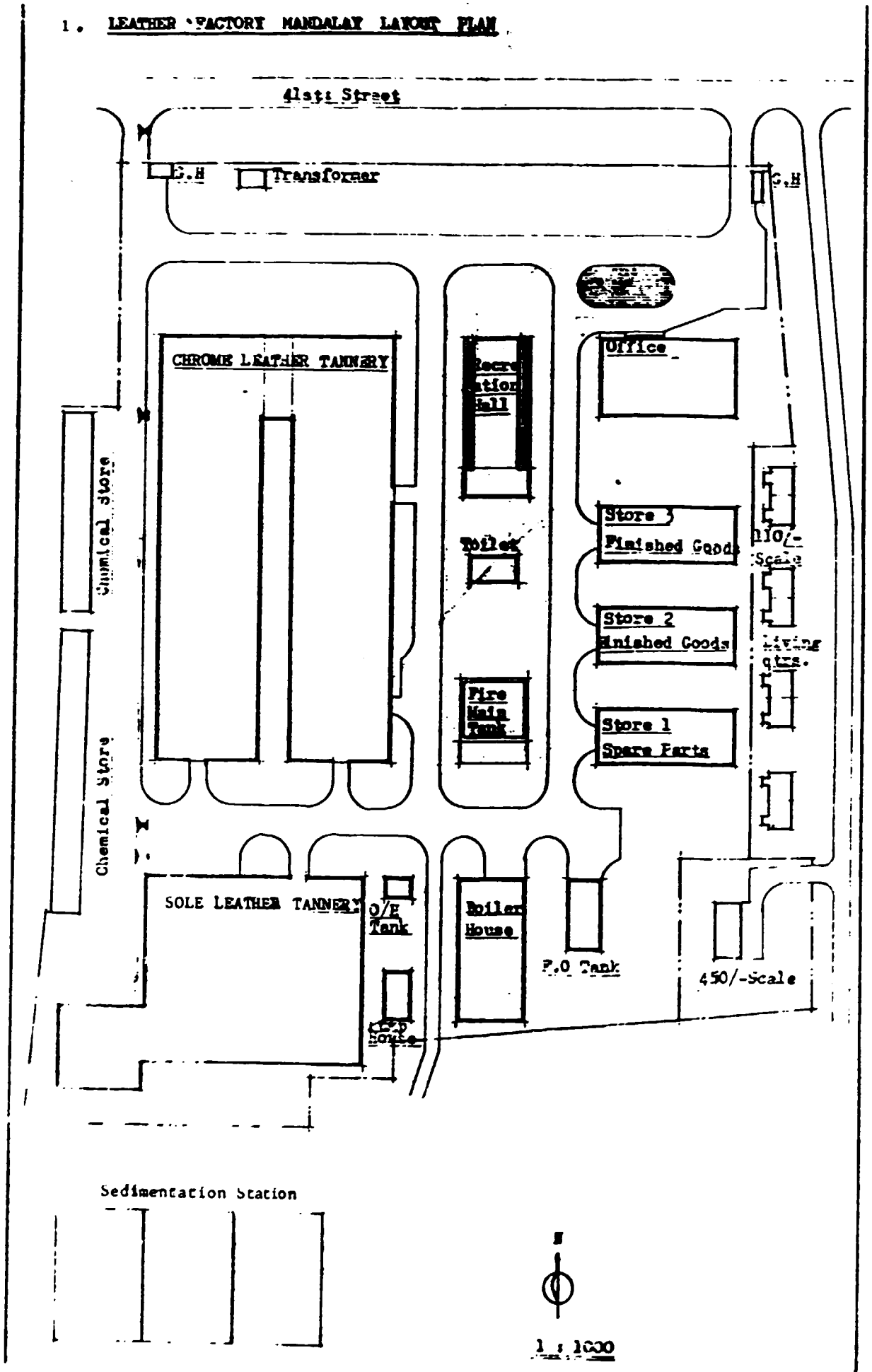
ANNEX 6

C O N T E N T S

Item

1. Layout Plan of LF(M)
2. Scope of the Contract for
Renovation/Valuation
3. Equipment/Machinery
Buildings, Project Documentation,
Electricity, Water, Steam, etc.

1. LEATHER FACTORY MANDALAY LAYOUT PLAN



SCOPE OF THE CONTRACT

1.1	<u>Technological Machines and Equipment :</u>	
1.1.1	Machines and equipment for processing 400 hides FOB US\$ into upper leather as specified	1,268,455.00
1.1.2	Machines and equipment for processing 100 hides into sole leather as specified	221,715.00
1.1.3	Machines and equipment for processing 300 skins into leather as specified	122,310.00
1.1.4	Material handling equipment as specified	81,910.00
1.1.5	Auxiliary equipment as specified	22,340.00
1.1.6	Laboratory equipment as specified	20,690.00
1.1.7	Spare parts for machines and equipment as specified	348,610.00
	Total	2,086,030.00
1.2	<u>Deliveries connected with the renovation of the Leather Factory</u>	
1.2.1	Project documentation	245,000.00
1.2.2	Outside pipe lines as specified	60,480.00
1.2.3	Inner pipe lines as specified	122,670.00
1.2.4	Pipe line for outside waste water	70,480.00
1.2.5	Materials and equipment for electricity network and distribution to the machine	420,940.00
1.2.6	Materials and equipment for lighting and earthing of the Production Building	95,740.00
1.2.7	Materials and equipment of energy-supply unit	86,400.00
1.2.8	Special Electric hoists for sole tannery	18,200.00
1.2.9	Main steel structures for the new production halls	353,000.00
	Total	1,472,910.00

SCOPE OF THE CONTRACT**1.3 Services**

1.3.1 Training of (9 member) Purchaser's personnel	US\$	67,500.00
1.3.2 Specialists for erection supervision of machines and equipment	DM	745,115.00
	and	Kyat 125,050.00
1.3.3 Specialists for the start-up and test-run supervision of the tannery units	DM	358,895.00
	and	Kyat 56,450.00
1.3.4 Specialists for erection supervision of deliveries	DM	786,941.00
	and	Kyat 129,650.00
1.3.5 Total prices for the services	DM	1,870,951.00
	and	Kyat 391,150.00

1. Technological machines and equipment	FOB US\$	2,086,030.00
2. Deliveries connected with the renovation	FOB US\$	1,472,910.00
3. Training 9 members	US\$	67,500.00
4. Services	DM	1,870,951.00
	Kyat	311,150.00

	US\$	3,626,440.00	DM	1,870,951.00
and	Kyat	311,150.00		

Equipment / Machinery

1001 Drum for soaking and lining 3500 x 3000, steel door	2	US\$	90,460
1002 Hydraulic fleshing machine 2700 mm	1		37,285
1003 Splitting machine 1800	1		36,286
1004 Gauge for setting the disc of splitting knife	1		81
1005 Tracing and balancing stand of grinding discs	1		1,951
1006 Drum for delimiting-tanning 3500 x 3000 steel door	3		136,965
1007 Rotary sawing machine 1800	3		62,302
1008 Hydraulic shaving machine 1500 mm	3		134,280
1009 Tracing and balancing stand for grinding discs	1		1,785
1010 Spare blade cylinder including bearings	1		5,355
1011 Drum for liquoring-dyeing 2500 x 2000	5		57,400
1012 Hydraulic setting out machine 1800	1		20,520
1013 Hydraulic setting out machine 1500	1		19,500
1014 Frame drier 60 frames (3160, 1460)	3		124,695
1015 Toggle for leather dr. w/in frame drier	20000		51,000
1016 Through-feed staking machine 1800 mm	1		38,410
1017 Electric disc-type trimming machine	3		2,739
1018 Grinding equipment of trimming discs	1		2,193
1019 Buffing machine 250	2		14,860
1020 Roller Buffing Machine through-feed 1800	2		40,800
1021 Dust exhauster and collector	2		13,934
1022 Through-feed Dust removing machine 1800	1		26,775
1023 Exhauster and dust collector of dust	1		66,170
1024 Through feed tunnel drier after curtain coating	1		127,300
1025 Hydraulic plating machine 1570 x 660	2		78,650
1026 Embossing plates 1570 x 660	10		13,000
1027 Equipment for dismantling of table piston	1		765
1028 Collar for hydraulic oil plating	3		1,002

1029	Spraying chamber of explosion-proof type	1	11,900
1030	Spraying gun with lever bin	8	1,944
1031	Spraying and drying automatic machine 1800	1	73,695
1032	Pin-wheel area measuring machine 1625	2	18,360
1033	Bridge balance capacity 2000 kg 1500 x 2000	1	3,098
1034	-do- 1000 kg 1250 x 1500	1	2,780
1035	-do- 200 kg 1000 x 1000	1	2,372
1036	Combined table balance 20 - 3000 grams	3	1,912
1037	-do- 3 kg	5	1,780
1038	Measuring tub 1000L	3	1,224
1039	Measuring tub 350L	5	1,785
Total			1,268,455

MACHINE AND EQUIPMENT FOR PROCESSING HIDES INTO SOLE LEATHER

2001	Drum for liming and relining 3500 x 300 steel door	2	90,460
2002	Drum for pretanning and retanning 2500 x 2000	4	40,120
2003	Hot-air drum for fixation bleaching fatliquoring	2	18,000
2004	Hot-air equipment	2	1,700
2005	Drum for washing after tanning 2500 x 2000	1	10,030
2006	Hydraulic drum setting out machine 1800	1	27,541
2007	Hydraulic sole leather rolling machine 50,000 kg	1	33,150
2008	Measuring tub 550L	2	714
Total			221,715

MACHINES AND EQUIPMENT FOR PROCESSING SKINS INTO LEATHER

3001	Drum for soaking and liming 2500 x 2000	1	10,030
3002	Hydraulic fleshing machine 1500	1	21,790
3003	Drum for deliming 2500 x 2000	2	20,060
3004	Drum for tanning 2500 x 2000	1	10,030
3005	Roller staking machine 1200	1	15,300
3006	Dust exhausting and collecting	1	4,208
3007	Hydraulic plating machine 1370 x 1000	1	40,535
3008	Measuring tub for soaking 350L	1	357
			122,310

MATERIAL HANDLING EQUIPMENT

4001 High-life motor truck 2.5 t	2	78,030
4002 Hydraulic manual truck 2.0 t	4	3,880
	Total	<u>81,910</u>

AUXILIARY EQUIPMENT

5001 ... 5009	Total	22,340
---------------	-------	--------

PROJECT DOCUMENTATION

- 2.1.1 Technological part of the tannery project will consist of detail layout of technological machines and equipment and technical report of the technological process and machinery, energy, chemicals and main power requirements.
- 2.1.2 General layout of the site.
- 2.1.3 Complete working project design of the chrome tannery, including civil engineering parts of the buildings, foundations for the technological machines and equipment, energy supply and distributions system coverages, lighting and earthing.
- 2.1.4 Completing working project design for the energy supply building including all civil engineering structural design and distribution system.
- 2.1.5 Working drawing for the reconstruction of the present factory building.
- 2.1.6 Outside piping system for the main production buildings including pipe supporting bridges.
- 2.1.7 Outside main waste drainage system including re-pumping station and sedimentation lagoons.
- 2.1.8 Outside water supply system (excluding wells and water tower).
- 2.1.9 Fire fighting water network including pressure pumps, above ground hydrants and fire water reservoir.
- 2.1.10 Outside lighting network along main road.
- 2.1.11 Road's layout with levels in the factory site.

- 2.1.12 Suggested location of laboratory with energy requirements.
- 2.1.13 Suggested location of store for final products and spare parts.
- 2.1.14 Proposal for extension of raw hides and skins store and chemicals stores.

OUTSIDE PIPE LINES

- 2.2.1 Material and equipment for the ground, underground and above pipe lines/excluding pipe support bridge.
- 2.2.2 Pipes for fire water and service water outside buildings lines including necessary fitting and hydrants.
- 2.2.3 Pipes, steams, condensates, compressed air including all necessary fittings, pumps, insulation material and paints.
- 2.2.4 Spare parts for 2-year operation for items where justified.

INNER PIPE LINES

- 2.3.1 Materials and equipment for the inside piping distribution system of the sole and chrome tannery buildings.
- 2.3.2 Pipes for distribution of steam, condensate, compressed air, fire-fighting water, line, cold and waste water including necessary insulation materials, fittings, valves and paints.
- 2.3.3 Pumps for repumping line and water, switching equipment, wall type fire-fighting hydrants with their accessories.
- 2.3.4 Spare parts for 2 year operation for items where justified.

PIPES FOR OUTSIDE WASTE WATER SEWERAGE

- 2.4.1 Materials and equipment for the tannery waste water sewage of outside chrome and sole leather tanneries lines.
- 2.4.2 Seamless steel pipes, cast iron pipes, acid-proof earthen ware pipes including necessary fittings, valves, insulation materials, paints.
- 2.4.3 Pumps for repumping tannery waste from the repumping station to the lagoons.
- 2.4.4 Spare parts for 2 year operation for items where justified.

MATERIALS AND EQUIPMENT FOR ELECTRICITY NETWORK AND DISTRIBUTION TO THE MACHINES

- 2.5.1 One transformer type BTS 630
- 2.5.2 High tension switchgear
- 2.5.3 Cast iron cases and switchboards
- 2.5.4 Low tension cables diameter up to 4 x 95 sq. mm.
- 2.5.5 - d o - above 4 x 95 sq. mm.
- 2.5.6 Control cables
- 2.5.7 Motor outlet up to 10 kw
- 2.5.8 Motor outlet from 10 kw to 50 kw
- 2.5.9 Earthing lines
- 2.5.10 Two sets of additional equipment for transformer station and maintenance
- 2.1.11 Spare parts for 2-year operation for items where justified.

MATERIALS AND EQUIPMENT FOR LIGHTING OF THE TANNERY PRODUCTION BUILDINGS

- 2.6.1 One panel of low tension case switchboard
- 2.6.2 Cast iron cases and switchboards
- 2.6.3 Low tension cables diameter up to 4 x 95 sq. mm
- 2.6.4 Incandescent lighting fixtures and supply cords.
- 2.6.5 - d o - Type EX and supply cord
- 2.6.6 Fluorescent lighting fixtures and supply cords.
- 2.6.7 Gas discharge lighting fixtures and supply cords.
- 2.6.8 One-phase socket outlets
- 2.6.9 Sixteen lighting poles with supply cords.
- 2.6.10 Earthing rods
- 2.6.11 Lighting rods
- 2.6.12 Spare parts for 2-year operation

MATERIALS AND EQUIPMENT FOR ENERGY SUPPLY UNIT

- 2.7.1 Materials and equipment for compressor room consist of two compressors including air dryer, air receiver 1000 litre content, inter-connecting pipings and fittings.
- 2.7.2 Pipes and necessary materials for distribution of steam, air drainage and sewerage
- 2.7.3 Equipment for water heating including pumps, heaters, necessary fittings, insulation materials and paints.
- 2.7.4 Complete repumping station for condensate including centrifugal pump, steel tank and necessary inter-connecting piping fitting.
- 2.7.5 Spare parts for 2-year operation.

SPECIAL ELECTRIC HOISTS FOR SOLE TANNERY

- 2.8.1 Two pieces of electrical hoists for sole leather 3.2 ton
- 2.8.2 Steel rails for hoists

Starting Bases

- 1. Topographical
- 2. Hydrological
- 3. Climatological
- 4. Geological

Description of Buildings

- | | | |
|--|---|-----------------------|
| 1. Building (1) Upper leather tannery | Built up area | 4,428 m ² |
| | Built-in space | 35,424 m ³ |
| | Dimension | 2 x 24 x 90 |
| | Clearance height | 5.7 m |
| 2. Building (2) Sole leather tannery | 2,615 m ² - 17,520 m ³ | |
| | 43.67 x 52.07 + 18.5 x 18.5, 4.8 | |
| 3. Energy supply unit | 565 m ² 3901 m ³ - 15 x 30 + 7.5 x 15.5, | |
| | 6.0, 4.2 m | |
| 4. Fire mains - Underground hydrants - a fire fitting basin for 205 m ³ with compressor station, for increasing pressure to 0.65 Mpa will be built. | | |
| 5. Repumping station | Built up area 81 m ² , built in space 259 m ³ | |
| 6. Sedimentation Lagoons | 600 m ³ each | |
| 7. Water pump 700L/min., tower capacity 100 m ³ at 15 meter (22222 gal, 50ft) | | |
| 8. Fire pump 1600 L/min. capacity 250 m ³ (55555 gals) | | |

Power Energy Requirement

Steam : Need/day 10 ton

average need per hr. 1.2 ton

peak need/hr 1.5 ton

Compressed Air : Need/day 650 Nm³

Average per hr 81 Nm³

Peak per hr 150 Nm³

Cold and Warm water technological 450 m³

Other 44 m³, Average per hr. 61.75 m³

Peak 34 litre/sec

Fire fighting 26.3 litre/sec.

ANNEX 7

C O N T E N T S

Item

1. Maintenance Section
2. Preventive Maintenance
3. Maintenance Programme (Monthly)
4. Machine Defect Record
5. Machine Log Book

Machine Maintenance Section

To maintain the machineries and equipment which are installed in the following plants :

- (i) Leather Factory No. 1
- (ii) Leather Factory No. 2
- (iii) Leather Fibre Board Factory

Rules Governing Maintenance Work

- 1) All requests for maintenance work must be made (in writing) at one control point. No work should be carried out without the knowledge and approval of the maintenance supervisor at that point.
- 2) No maintenance work should be undertaken by productive staff (except in an emergency) unless that work is done under the supervision of the maintenance section, that is, unless the operator concerned is effectively seconded to the maintenance section.

The Maintenance Group for Leather Factory No. 1

- 1) Mechanical Group a) Preventive Maintenance Group
b) Daily Maintenance Group
- 2) Electrical Group a) Preventive Maintenance Group
b) Daily Maintenance Group

Manpower for the maintenance group

- 1) Mechanical Group a) Supervisor 1
b) Group Leader 2 (Preventive Group, and Daily Maintenance Group)
c) Fitter 2 (one each group)
d) Helper 2 (one each group)
- 2) Electrical Group a) Supervisor 1
b) Group Leader 2 (one for each group)
c) Technician 2 (one for each group)

Preventive Maintenance

The maintenance programme for the whole financial year for the Leather Factory are as shown. According to that plan, we set Monthly Preventive Maintenance Programme. The Preventive Maintenance Group process according to the Monthly Maintenance Programme, and records of all work carried out in the form as shown.

Daily Maintenance

Duties for the daily maintenance group are :

- a) To inspect the machine
- b) to adjust the machine according to the production
- c) to lubricate the machine according to the Lubrication Plan
- d) to repair the minor break down of the machine according to the request of the Production Manager (All requests are written in the form as shown in Annex E)
- e) Records of all work carried out in the form as shown in Annex F.

Data Recording

The Supervisor of the Maintenance Group records all data as per following procedure and keeps as Machine Log Book.

- 1) Entry Monthly Preventive Maintenance into the Form A
- 2) entry machine defect into the Form B
- 3) entry all replacement parts into the Form C
- 4) entry all repaired parts into the Form D
- 5) entry working hours and production into the Form E

Also monthly summaries of all production, working hours, idling time and break down time into the Form F.

Plan for Spare Parts

Purchasing twice a year - first part is 25% of the whole budget allotment and the second part is 75% of the whole budget allotment.

For the spare parts purchasing plan, we record the data as follows :

- 1) List down the major, minor and consumable parts (wear parts) separately into the Form G
- 2) Record all purchased parts into the Form H.

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LEATHER FACTORY (RANGOON)

SECTION. WET SECTION

SR. NO.	MACHINE NO.	MACHINE	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	REMARKS
1	W2-01	DRUM D28-1					||								|| PLAN || ACTUAL
2	W2-02	-DRUM D28-2						||							
3	W2-03	DRUM D01-1					||								
4	W2-04	DRUM D01-2						||							
5	W2-05	DRUM D01-3	||						||						
6	W2-06	DRUM 3805													
7	W2-07	FLESHING 2223													
8	W2-08	SAMMYING 2319													
9	W2-09	SPLITTING 364H													

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LEATHER FACTORY (RANGOON)

SECTION.

WET SECTION

SR. NO.	MACHINE NO.	MACHINE	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCE	REMARKS
10	WS-10	FLESHING 355							||||						
11	WS-11	SCUDDING 3593							||||						
12	WS-12	SETTING OUT 357A							||||						
13	WS-13	LIFTING PLATFORM No.1				||	||					||			
14	WS-14	LIFTING PLATFORM No.2						||						||	
15	WS-15	WATER PUMP												||	
16	WS-16	SCALE BALANCE 3000 KG													
17	WS-17	SCALE BALANCE 1000 KG													
18	WS-18	AIR COMPRESSOR No.1													

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LEATHER FACTORY (RANGOON)

SECTION. WET SECTION

SR. NO.	MACHINE NO.	MACHINE	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	REMARKS
19	US-19	AIR COMPRESSOR NO. 2													
20	--	POWER SYSTEM													
21	--	LIGHTING SYSTEM													

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LEATHER FACTORY (RANGOON)

SECTION. DRYING SECTION

SERIAL NO.	EQUIPMENT NO.	MACHINE	MONTHS												REMARKS	
			APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCE		
1	D8-01	SETTING OUT 356					■									
2	D8-02	SETTING OUT 357	■							■						
3	D8-03	SHAVING 354 H		■			■		■							
4	D8-04	SHAVING 361A							■							
5	D8-05	VACUUM DRYER	■							■						
6	D8-06	HANGING DRYER E8H 125					■									
7	D8-07	HANGING DRYER E8H 50					■									
8	D8-08	STAKING No.1		■												
9	D8-09	STAKING No.2			■											

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LEATHER FACTORY (RANGOON)

SECTION. DRYING SECTION

SR. NO.	MACHINE NO.	MACHINE	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	REMARKS
9	D8-09	STAKING No. 2													
10	D8-10	STAKING No. 3													
11	D8-11	TOGGLE DRYER I													
12	D8-12	TOGGLE DRYER II													
13	D8-13	TOGGLE DRYER III													
14	D8-14	WATER SPRAYER													
15		POWER SYSTEM													
16		LIGHTING SYSTEM													

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LEATHER FACTORY (RANGOON)

SECTION. FINISHING SECTION

SR. NO.	MACHINE NO.	MACHINE	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	REMARKS
1	F8-01	BUFFING M/c 600 mm			█										
2	F8-02	BUFFING M/c 1500 mm			█						█				
3	F8-03	MILLING DRUM M8.5			█					█	█				
4	F8-04	AIR BLAST DEGUSTING				█									
5	F8-05	HAND DRYER				█									
6	F8-06	ROTARY COATING				█									
7	F8-07	DRYING INSTALLATION				█									
8	F8-08	AUTO SPRAYER		█			█			█					
9	F8-09	EMBOSSING PRESS						█							

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LEATHER FACTORY (RANGOON)

SECTION. FINISHING SECTION

SR. NO.	MACHINE NO.	MACHINE	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCE	REMARKS
10	F8-10	ROTARY IRONING													
11	F8-11	MEASURING													
12		POWER SYSTEM													
13		LIGHTING POWER													

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LEATHER FACTORY (RANGOON)

SECTION. BOILER AIRCOMPRESSOR

SR. NO.	MACHINE NO.	MACHINE	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	REMARKS
1	BC-01	BOILER No.1													BOILER & COMPRESSOR HOUSE
2	BC-02	BOILER No.2													"
3	BC-03	AIRCOMPRESSOR No.1													"
4	BC-04	AIRCOMPRESSOR No.2													"
5	GT-01	AIRCOMPRESSOR No.1													UNDERGROUND TANK
6	GT-02	AIRCOMPRESSOR No.2													"
7	GT-03	WATER PUMP No. 1													"
8	GT-04	WATER PUMP No. 2													"
9	GT-05	TUBE WELL No. 1													"

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LEATHER FACTORY (RANGOON)

SECTION. BOILER AIRCOMPRESSOR

SR. NO.	MACHINE NO.	MACHINE	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	REMARKS
10	GT-08	TUBE WELL No. 2													UNDERGROUND TANK
11	OH-01	AIR COMPRESSOR													OVERHEAD TANK
12	OH-02	WATER PUMP No. 1													"
13	OH-03	WATER PUMP No. 2													"
14	OH-05	TUBE WELL No. 2													"

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TRANSFORMER HOUSE

LEATHER FACTORY (RANGOON)

SECTION.

SR. NO.	MACHINE NO.	MACHINE	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	REMARKS
1	TF1-01	AUXILIARY CUBICLE													
2	TF1-02	INCOMING CUBICLE													
3	TF1-03	PRIMARY CUBICLE I													
4	TF1-04	PRIMARY CUBICLE II													
5	TF1-05	TRANSFORMER I													
6	TF1-06	TRANSFORMER II													
7	TF1-07	SECONDARY CUBICLE II													
8	TF1-08	FEEDER CUBICLE II													

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LEATHER FACTORY (RANGOON)

SECTION. TRANSFORMER HOUSE

SR. NO.	MACHINE NO.	MACHINE	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	REMARKS
10	TF1-10	FEEDER CUBICLE I													
11	TF1-11	SECONDARY CUBICLE I													

MAINTENANCE PROGRAMME FOR THE MONTH OF SEPTEMBER 1984Sr. No. Machine No. Programme for maintenance

1. WS-08 **General overhauling**
 - (a) Dismantling all parts
 - (b) checking, repairing and replacing all defected parts
 - (c) replacing with new felt sleeves
 - (d) checking of lubrication system
 - (e) motors insulation check
 - (f) replacing all defected limit switches
 - (g) checking the safety function
 - (h) cleaning and repainting

2. WS-02 **Partially overhauling**
 - (a) Repairing and replacing of door spring
 - (b) replacing pneumatic valve
 - (c) replacing door chain
 - (d) cleaning and machine function checking

3. WS-04 **Partially Overhauling**
 - (a) Repairing and replacing of door spring
 - (b) Repairing ventilation system
 - (c) If necessary replacing teflon seal
 - (d) cleaning and machine function checking

4. WS-14 **General Overhauling**
 - (a) Repairing defected parts
 - (b) replacing defective limit switch
 - (c) cleaning, repainting and checking.

5. DS-04 **Partially overhauling**
 - (a) Reblading
 - (b) replacing drive belt 11 nos.
 - (c) replacing defective limit switch
 - (d) cleaning and function checking
 - (e) hydraulic oil renewing and lubrication system checking
 - (f) checking and inspection for general overhauling

6. DE-12 **Routine Maintenance**
 - (a) Inspection and cleaning
 - (b) function checking

7. FS-09 **Routine Maintenance**
 - (a) Inspection and cleaning
 - (b) Checking hydraulic oil and function

8. FS-10 **Routine Maintenance**
 - (a) Inspection and cleaning
 - (b) checking hydraulic oil, heating oil and function

MONTHLY PREVENTIVE MAINTENANCE RECORD SHEET

GENERAL INDUSTRIES CORPORATION
LEATHER FACTORY (RANGOON)

SEPTEMBER 1984

Sr. Machine		Repairing		Activities	Remarks	
No.	Machine	Start	End			
1	2	3	4	5	6	7
1	WS-01	Steel drum D 28(1)	5.9.84	5.9.84	Sliding doors adjustment	
			17.9.84	17.9.84	Cleaning and readjustment of teflon seal and mixing chamber -	
2	WS-02	Steel drum D 28(2)	13.9.84	14.9.84	General overhauling of gear box and all sliding doors, gear - oil renewing. Main drive chain cleaning & retensioning. Gear box foundation bolt inspection & retightening. Base frame cleaning & repainting	
3	WS-04	Steel drum D 10(2)	5.9.84	5.9.84	Doors. Adjustment and renewing one pneumatic valve	
4	WS-08	Sammy- ing 2319	20.9.84	21.9.84	Cleaning, washing and repainting, repairing the upper pressure roller bush 2 nos.	-
			24.9.84	28.9.84	Repairing the shaft of toggle mechanism bush - 4 nos. Repairing the shaft of toggle mechanism 4 nos. Repairing the shaft of toggle base mechanism 2 nos. Re-assembling the machine Replacing with new felt sleeve 2 nos. Repairing the pre-stretcher roller bearing 2 nos. Replacing with new V belt 5 nos. Machine adjustment	-
5	DS-03	Shaving 354 H	5.9.84	19.9.84	Resurfacing the pressure roller at Metal Corporation workshop. Cleaning and readjusting.	-
6	DS-12	Toggle Dryer	6.9.84	6.9.84	Inspection cleaning and readjustment all parts	

Sr. Machine No. Number		Machine	Repairing Start End		Activities	Remarks
1	2	3	4	5	6	7
7	FS-09	Embossing press	28.9.84	28.9.84	Inspection of the function of machine and safety system. Inspecting hydraulic oil and general cleaning.	
8	FS-10	Rotary ironing	6.9.84	6.9.84	Retensioning the V belt and chain. Checking heating oil and lubrication system. Cleaning glazing cylinder. Safety guard function checking	
9	GT-01	Air compressor	1.9.84	1.9.84	Readjustment of crankshaft, cleaning and renewing engine oil, gear pump drive belt. Operation check.	
10	WS-14	Lifting platform 2	-	-	-	Lift No. 1 breakdown (motor rewinding)
11	DS-04	Shaving 361 A	-	-	-	According to the production plan. Will be repairing at the time of renewing shaving knife (next month)

253

MACHINE DEFECT RECORD

Sr. Machine No.	Machine No.	Job No.	MACHINE			Repairing Parts	Replacing Parts		Remarks	
			STOP	RESTART	BREAK DOWN TIME		Part Name	Qty.		
1	Samyang m/c	WS-08	1	7:30	10:00	2:30	Foot switch & Joint pin	-	-	
2	Steel drum D-28 (2)	WS-02	2	7:30	11:00	3:30	Mixing unit	Teflon Axle seal	1	Cleaning & adjustment
3	Auto sprayer	RS-08	3	10:15	14:00	3:45	Water spraying pipe for exhaust	-	-	
4	Staking m/c	DS-08	4	14:30	15:15	0:45	Cleaning Lubricator	-	-	

MINISTRY OF INDUSTRY No. (1)

GENEVE INDUSTRIES CORPORATION

LEATHER FACTORY

(RANGOON)

M A C H I N E L O G B O O K

(1984 - 1985)

HYDRAULIC SAMMYING MACHINE - 2319

MONTHLY MACHINE DEFECT RECORD SHEET					Month 10	
M/C No. VS-08		Machine Name Hydraulic Samming			Wet Section	
Sr. No.	Date	Defected Parts	Stop	Start	Breakdown time	Remarks
1	2	Side cover repairing and				
2		refitting	7:00	8:30	nil	7/0 production
3						
4	5	Welding the cover base	14:00	16:00	nil	Overtime-
5						7/0 production
6	8	Repairing the Hydraulic pipe	7:00	7:30	0:30	
7		line leakage				
8						
9	30	Repairing the main drive chain	12:45	14:00	1:15	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						

REPLACEMENT PARTS RECORD SHEET					Machine No. WS-08	
Machine Name Hydraulic Samming Mc 2319					Wee Section	
Date	Part Number & Part Name	I.V. No. Date	Qty	Cost		
				Kyats	Pyas	
14-9-84	Pressure Spring 700023050	62	1	25	00	
		14-9-84				
1-10-84	Limit Switch LLSL-4PG	246	2	1090	00	
	Limit Switch BLS-7 2R.S.I.C	1-10-84	1	534	00	
1-10-84	Bronze bush for Pressure roller 120/1300-1300	247	1	360	00	
	Bronze Bush for taggle 70/85 Ø x 60-r	1-10-84	4	270	00	
27-8-84	Impulse Relay (MIR-5)	811	1	2045	00	
		27-8-84				
20-9-84	Felt Sleeve 350F+LWx1900	201	2	202	00	
	Bush 80/90 x 1130	20-9-84	2	2436	00	
	Bush 80/70 x 135		2	1680	00	
	V belt 17x11x2500		5			
2-10-84	Limit switch LLSL-4PG	253	1	9040	00	
		4-10-84				
4-10-84	Screw	260	12	24	00	
	Grease Nipple	4-10-84	12	84	00	
25-10-84	Grease Nipple H-10-2301	558	5	902	50	
		25-10-84				
14-9-84	Spring 07000239300	62	2	50	00	
		14-9-84				

MONTHLY MACHINE WORKING HOURS RECORD SHEET								Month: 10		
M/C No. WS - 08		Machine Name Hydraulic Sanying M/c				Net-		Section		
Date	Day	Product				Hour Record				
		B.C Cattle				Start	End	Run- ing	Idle	Defect
1		Maintaining According to the Preventive Program.								8:00
2										8:00
3		600				8:00	14:00	6:00	2:00	
4		600				8:00	14:00	6:00	2:00	
5		600				8:00	14:00	6:00	2:00	
6	SAT.									
7	SUN.									
8		600				8:30	14:30	6:00	2:00	0:30
9	FULL MOON DAY	(Holiday)								
10		600				8:00	14:00	6:00	2:00	
11		600				8:30	14:30	6:00	2:00	
12		600				8:00	14:00	6:00	2:00	
13	SAT.									
14	SUN.									
15		600				8:20	14:20	6:00	2:00	
16		600				8:30	14:30	6:00	2:00	
17		600				8:50	14:50	6:00	2:00	
18		600				8:00	15:00	7:00	1:00	
19		600				8:00	15:30	7:30	0:30	
20	SAT.									
21	SUN.									
22		600				8:00	14:00	6:00	2:00	
23		600				8:00	14:30	6:00	2:00	
24	D.	(Holiday)								
25		500				8:00	15:00	7:00	1:00	
26		600				8:00	16:00	8:00	-	
27	SAT.									
28	SUN.									
29		600				8:00	15:00	7:00	1:00	
30		400				8:00	15:00	7:00	1:00	1:15
31		800				8:00	15:00	7:00	1:00	
total						total		122:30	45:30	

SPARE PARTS LIST						MACHINE No. WS - 08
Machine	Hydraulic Sawing m/c			Working Width	2100 mm	Part:-
Type	2319			Serial No.	703776	BUSH
Sr. no.	Code	Part Number	Qty	Specification	Function	
1	1005	7.1266	2	80/90 ϕ x 130 mm	connecting drive	
2	1011	7.1767	2	120/130 ϕ x 180 mm	for upper pressure roll.	
3	1021	7.1256	2	130/130 ϕ x 60 mm	for lower pressure roll.	
4	1032	7.1264	2	70/80 ϕ x 95 mm	for connecting rod head	
5	1104	7.1293	1	70/80 ϕ x 190 mm	For toggle arm.	
6	1041	7.1325	2	50/60 ϕ 50 mm	Rubber Roller bearing.	
Note:-						Reference

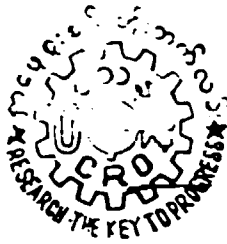
ANNEX 8

C O N T E N T S

Item

1. Factory Effluent
Water Analysis

2. Effluent - Sedimentation
Tank/Pits



Certificate

Phone 50544

Cable CROUR

THE SOCIALIST REPUBLIC OF THE UNION OF BURMA
CENTRAL RESEARCH ORGANIZATION

No. 6, Kaba Aye Pagoda Road,

Yankin P. O. Rangoon.

Reference: ၂၀၀: ၅၃၁၇၆ (၇၆၇၆) ၊ အတွေးအခေါ်အယူပုံစံ: ၅၀၅၆၀၅
Sample: ၀၅-၀-၀၄ နေ့စဉ်ပိတ်ဆို့မှု - ၀၄၀၆/၃၀၃-၁/၀၄-၀၅
၅၆၀၆၀၅

RESULT

<u>Sample No.</u>		<u>497/84-85.</u>	<u>498/84-85.</u>
<u>Sample Marked.</u>		<u>Main Soaking.</u>	<u>Liming.</u>
Total Solids	(p.p.m.)	67445	67160
Alkalinity as CaCO ₃	"	2191	4820
Carbonate as CO ₃	"	362.06	2103.36
Bicarbonate as HCO ₃	"	1924.86	1603.8
Soluble Iron as Fe	"	0.1	0.25
Chromium as Cr ₂ O ₃	"	Nil	Nil
Ammonia as NH ₃	"	798	2142
Sodium Sulphide as Na ₂ S	"	298	4935
B . C . D .	"	7400	7400

Method & Equipment used. Standard methods for the examination of water and sewage. 8th Edition. (A.F.H.A.).

Tested by:

(နေ့စဉ်ပိတ်ဆို့မှု) (၅၆၀၆၀၅)

Checked by:

(နေ့စဉ်ပိတ်ဆို့မှု)

Technical Director:

Our File No. 1000

Date 5-12-84

CENTRAL RESEARCH ORGANIZATION

CONTINUATION
OF CERTIFICATE

<u>Sample No.</u>		<u>497/84-85.</u>	<u>498/84-85.</u>
<u>Sample Marked.</u>		<u>Main Soaking.</u>	<u>Lining.</u>
C.O.D.	(P.P.M.)	1600	7000
pH Value		8.8	10.4

- p.p.m. = parts per million.
- B.O.D. = Biochemical Oxygen Demand.
- C.O.D. = Chemical Oxygen Demand.

Tested by:

(*Handwritten signature*) (*Handwritten signature*)

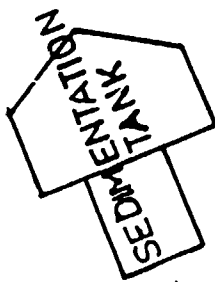
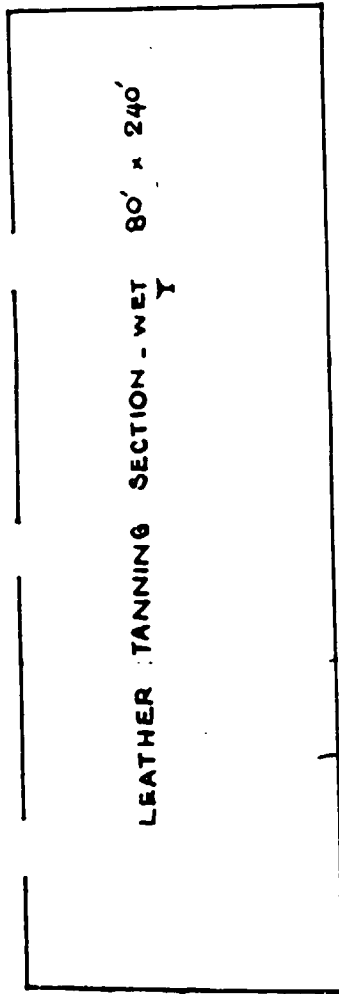
Checked by: (*Handwritten signature*)

Technical Director.

(*Handwritten signature*)
(*Handwritten signature*)

Our Reference No. - 352/12-179/84-85.

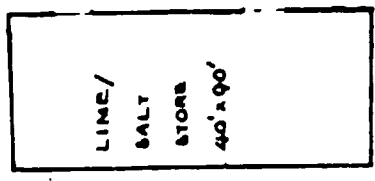
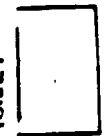
Date: 5/12/84

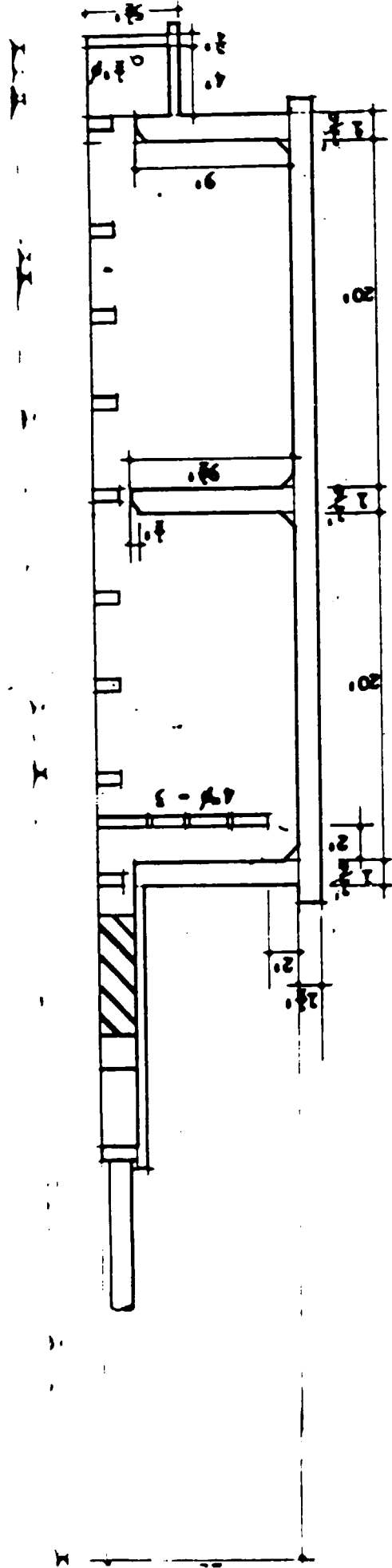


TO CREEK

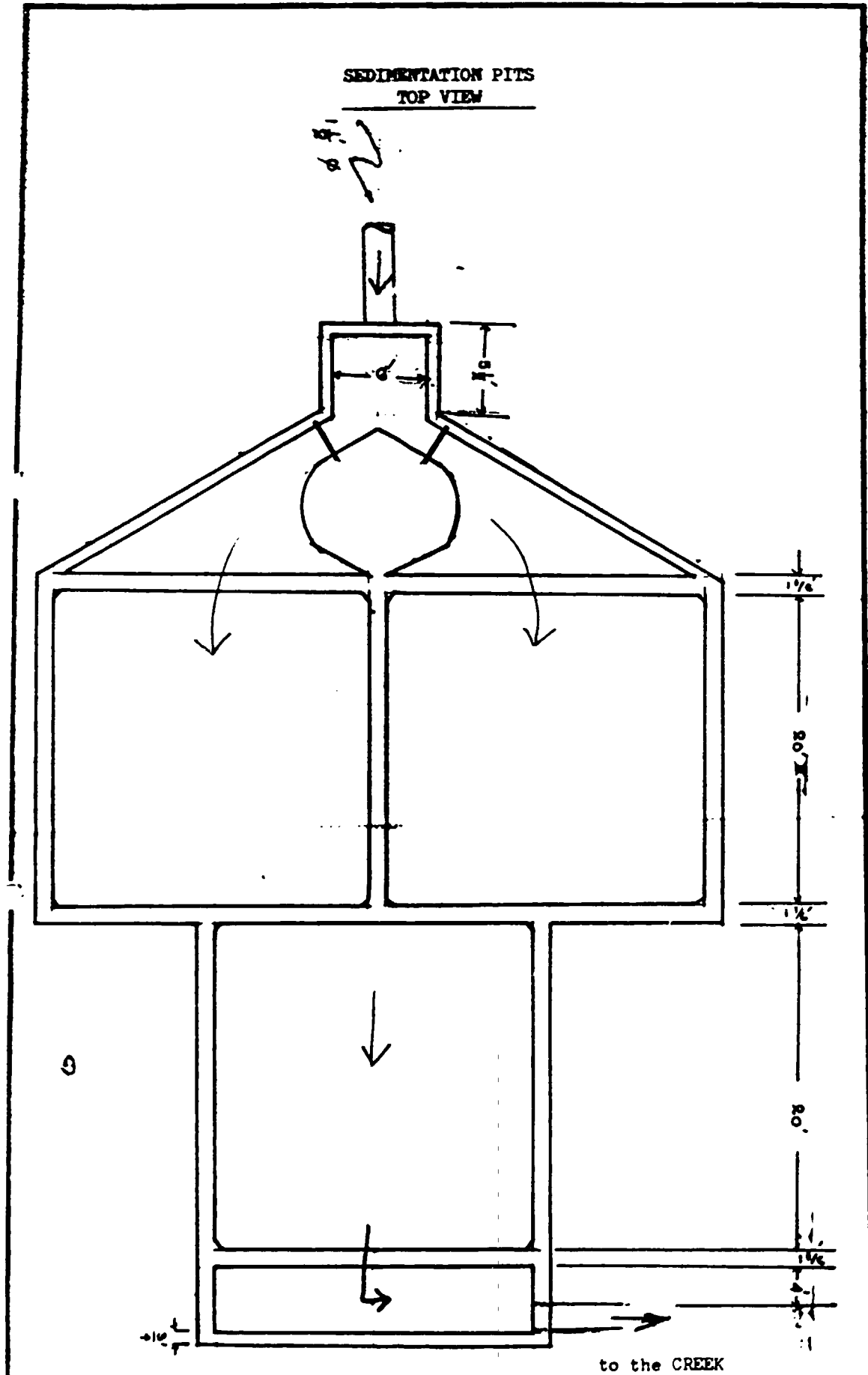
ဆရာမိန်ဆိုင်ကန်ထည့်ရာမြေဧရိယာ

TOILET





SEDIMENTATION TANK / PITS	
6.I.C	26-12-1
LEATHER FACTORY (RGN)	84005



ဒါနယ်ဆိုင်ကန်အိမ်နားပုံ

ANNEX 9

C O N T E N T

Item

1. International Specifications for various types of Leather.

Recommendations

International Specifications

Annex

Reporting Item 6

Characteristics	IS: 3297-1965	IS: 3982-1966	IS: 575-1956	IS: 4191 - 1967	
	Water resistant V. T. Leather	Sheepskin (for Orthopaedic Inging)	Chrome belt lace	Chrome	Vegetable
1. Oils and fats max.	5.0%	12-18%	8-20%	2.5%	3-8%
2. Chrome as Cr ₂ O ₃ min.	—	1.5-2%	2.3-4.9%	3.0%	—
3. pH (min).	3.5	3.5	—	3.2	3.6
4. Crackiness.	should not crack	—	—	should not crack	shall not crack
5. Tear strength kg/cm.	—	—	—	—	—
6. Colour fastness.	—	—	—	—	—
7. Tensile strength kg/cm. min.	—	150.0	280.0	200.0	200.0
8. Total ash, % max.	—	—	4.0-6.0%	—	1.5% max.
9. Water soluble % max.	12.0	3.0%	—	—	15.0%
10. Differential figure, max.	0.7	—	—	—	0.0
11. Hide substance, min.	—	40-45%	—	—	—
12. Fixed organic matter.	—	—	—	—	—
13. Water absorption ½ hr.	6.0%	—	—	25%	110%
2 hrs.	12.0%	—	—	30%	50%
24 "	25.0%	—	—	35%	55%
14. Degree of tannage min.	55°	—	—	—	50°
15. Apparent Density.	0.95-1.3	—	—	—	—
16. Elongation, % min.	—	—	—	55.0%	55.0%
17. Stitch tear kg./cm. thickness.	—	55.0 min.	—	66.0	60.0
18. Combined oil and fats	—	—	—	—	—
19. Siak test.	—	—	—	—	—
20. Weight per meter.	—	—	—	—	—
21. Shrinkage in water at 92°C.	—	—	—	—	—
22. Resistant to oil at 6°C.	—	—	—	—	—
23. Resistant to hot air at.	—	—	—	—	—
24. Grain strength, kg/cm. thickness.	—	—	—	—	—
25. Insoluble ash %	—	2-3%	—	—	0.5%
26. Thickness min.	—	—	—	1.7 mm.	1.7 mm.
27. Soluble ash, % max.	—	—	—	—	1.0%
28. Resistance to water at 100°C	—	—	—	—	—
29. Resistance to cold air.	—	—	—	—	—
30. Shrinkage in oil% area max.	—	—	—	—	—
31. Shrinkage temperature.	—	—	—	95°C	77°C
32. Colour penetration	—	—	—	—	—
33. Resistant to mould growth	not specified	—	not specified	specified	specified

TABLE I
REQUIREMENTS FOR SOLE LEATHER IN VARIOUS STANDARDS

Sl. No.	Characteristics	IS: 579 1962*	S.I. 199 61**	CGSB S-GP-1	COST 1010 -63@@	KK-L 26*10
1.	Apparent pensity, <i>Min</i>	0.95	—	—	—	—
2.	Water absorption, percent by weight, <i>Max.</i>					
	$\frac{1}{2}$ h	40	—	—	—	—
	2 h	40	40	—	60	—
	24 h	45	50	—	65	—
3.	Degree of tannage, <i>Min</i>	55	60-85	63	60	63
4.	Oil and fat content, percent by weight	5.0 <i>Max</i>	1.0 <i>Min.</i>	4-8	—	4 <i>Min.</i>
5.	Total ash, percent by weight	2.0	2.5	—	—	—
6.	Insoluble ash, percent by weight	1.0	—	1.0	— 3.5-	1.0 3.0-
7.	pH of water Solubles, <i>Min</i>	3.3	3.5	3.0-4.0	5.0**	4.0
8.	Water solubles, percent by weight, <i>Max</i>	15.0	21.0	33.0	20.0	33.0

* Specification for sole leather (India).

** Specification for bend leather for sole (Israel).

@ Specification for leather; sole vegetable tanned (Canada).

@@ Specification for bottom leather of shoe for thread and cement (Glue) Method of construction (USSR).

† Specification for leather, sole; vegetable tanned (USA).

‡ pH of potassium chloride extraction.

Note:—Unlike other standards, USSR standard prescribes many other physical tests, like modulus of elasticity, resistance to abrasion and tension stretch.

TABLE 2
REQUIREMENTS OF WATER-RESISTANT SOLE LEATHER

Sl. No.	Characteristics	Requirements		
		IS : 3297-1965*	CGSB 5 CP-2†	KK-L-165b@
1.	Apparent density	0.95-1.3	—	—
2.	Insoluble ash, percent by weight, <i>Max.</i>	—	1.0	—
3.	Water absorption, percent by weight, <i>Max.</i>			
	½ h	6	—	10
	2 h	12	—	—
	24 h	25	15*	30
4.	Water solubles, percent by weight, <i>Max.</i>	12	27	—
5.	Free oils and fats, percent by weight.	5.0 <i>Max.</i> **	17 <i>Min</i>	18.0 <i>Max</i> ‰
6.	Degree of tannages, <i>Min.</i>	55.0	55.0	61.0
7.	pH of water solubles, <i>Min.</i>	3.5	3.0	3.0

* Specification for water-resistant sole leather (India)

† Specification for leather, sole vegetable tanned water proofed (Canada)

@ Specification for leather, cattle hide, vegetable-tanned and chrome tanned impregnated; and soles (USA)

• Gravimetric method; time of soaking — 6 h

** For soles other than those impregnated with oils and fats.

‰ Chloroform extract.

TABLE 3

		REQUIREMENTS OF FULL-CHROME UPPER LEATHER			
Sl. No.	Characteristics	Requirement			
		IS : 578 - 1964*	TCL 9140 - 1964**	5-CP-3†	COST 939 - 65‡
1.	Free oils and fats, percent by weight	2.5-6.0	2-6	3 Min.	3.7-8.5
2.	Chromium (Cr ₂ O ₃), content percent by weight	2.5-6.0	3.5 Min.	4-6	4.3 Min.
3.	pH	4.5-6.0	not below 3.5	3-5	—
4.	Tensile strength, kg/Cm, @ Min.	210	250	28.2@	250
5.	Tearing @@ strength, Kg/Cm thickness, Min.	45	30	—	—
6.	Colour fastness to rubbing	To pass both wet & dry rubbing	—	To be specified by the purchaser	—
7.	Water absorption, percent by weight, Max.				
	2 h	—	60	30@@@	—
	24 h	—	85	—	—
8.	Flexing endurance, No. of cycle, Min.	—	20,000	—	30,000

* Specification for full chrome upper leather (revised) (India)

** Specification for chrome upper leather with natural grain (East Germany)

† Specification for leather, upper, kip skin chrome tanned (Canada)

‡ Specifications for chrome tanned upper leather (USSR)

@ Breaking load in kg.

@@ Canada specified Min. 75 lbs stitch tear strength

@@@ Gravimetric method; soaking time- 6 hour.

TABLE 4
REQUIREMENTS FOR RETAN UPPER LEATHER

Sl. No.	Characteristic	Requirements		
		IS : 2961-1964†	TGL 9141-1964‡	S. GP-4@
1.	Total ash, percent by weight	2.0 over Cr ₂ O ₃	2.0 over Cr ₂ O ₃	—
2.	Oils and fats, percent by weight	3.5 to 8.0	2 — 9	10
3.	Chromium (Cr ₂ O ₃) content, percent by weight	2.0 to 4.0	3.0 <i>Min.</i>	3 to 6
4.	pH	3.5 <i>Min.</i>	not below 3.5	3.0 <i>Min.</i>
5.	Hide substance, percent by weight	60 to 70	—	—
6.	Water absorption, percent by weight <i>Max.</i>			
	½ h	60	—	—
	2 h	—	60	—
	24 h	85	85	15*
7.	Tensile strength, kg./cm ² , <i>Min.</i>	250	225	27.2**
8.	Tearing strength, kg./cm thickness, <i>Min.</i>	43	25	—
9.	Flexing endurance, No. of cycle, <i>Min.</i>	—	20,000	—

† Specification for chrome retan upper leather (*India*)

‡ Specification for chrome upper leather with corrected grain (*East Germany*)

@ Specification for leather; upper chrome vegetable retanned water and fung-resistant (*Canada*)

* Gravimetric method; Soaking time — 6 h.

** Breaking load.

TABLE 5

Sl. No.	Characteristics	REQUIREMENTS FOR LINING LEATHER								
		IS: 3840-1960* (India)			COST 5 CP-10** (Canada)		COST 947-41* (U. S. S. R.)			
		Type 1 (CTL)	Type 2 (VTL)	Type 3 (FTL)	Type 1 (CTL)	Type 2 (VTL)	Type 1 (CTL)	Type 2 (VTL)	Type 3 (FTL)	
1.	Colour fastness (both dry rubbing and wet rubbing)	To pass the test			—	—	—	—	—	
2.	Stitch tear strength (double hole) kg/cm thickness, <i>Min.</i>	50	50	50	—	—	—	—	—	
3.	Tensile strength kg/cm ² , <i>Min.</i>									
	Cow, calf	—	—	—	175.7 (for all types)		130	130	140	
	Sheep skin	—	—	—			70	70	80	
	Goatskin	—	—	—			110	110	120	
4.	Water solubles percent by weight, <i>Max.</i>	—	10	—	—	10	—	—	—	
5.	Hide substance, percent by weight	40-60	40-65	65-75	—	45-55	—	—	—	
6.	Degree of tannage	—	45 <i>Min.</i>	—	—	50-75	—	—	—	
7.	Insoluble ash percent by weight, <i>Max.</i>									
	(a) Pigment finish leather	6.0	5.0	7.0	7.5††	0.75	—	—	—	
	(b) Aniline unfinished leather	2.5	0.75	4.0	—	—	—	—	—	
8.	Chromium (Cr ₂ O ₃) percent by weight	1.5 <i>Min.</i>	—	3.0 <i>Min.</i>	3-6	—	0.5 <i>Min.</i>	—	All type 3.5 <i>Min.</i> except sheep & Goat sheep-2.5 <i>Min.</i> Goat-3.0 <i>Min.</i>	
9.	Fats and oils percent weight	8 <i>Max.</i>	12 <i>Max.</i>	8 <i>Max.</i>	3-12	4-10	3.0‡‡	3.0‡‡	3.0‡‡	
10.	pH, <i>Min.</i>	3.5	3.5	3.5	3.0	3.0	—	—	—	

* Specification for lining leather (India)

** Specification for leather: lining, vegetable tanned and chrome retanned (Canada)

† Specification for lining leather (U. S. S. R.)

†† Total ash

‡‡ Chloroform and methyl alcohol extract

Characteristics (on 14% moisture)	IS 578-1964 Full chrome	IS : 2961-1964 Chrome retan upper	IS : 579-1962 Sole	IS : 580-1962 Harness	IS : 637-1960 Cycle saddle	IS : 576-1954 Glance kid	IS : 4553 Cricket Ball leather
Oil&fats	3 to 6. 0%	3.5 to 8.0	5.0% max	5.0% min.	3-10%	2.0-6.0	2.0 to 4.0%
Chrome as Cr ₂ O ₃	2.5 to 6.0%	2.0 to 4.0	—	—	—	3.5-6.5	...
pH	4.5 to 6.0	3.5 min	3.3 min	3.3 min.	3.3 min	4.0 to 6.0	3.5 min.
Crackiness	should not crack- at double folding	—	—	—	—	shall not crack- at double folding	grain shall not crack - at single folding.
Tear strength kg/cm.	45.0 min	43.0 min	—	—	—	1.4 to 1.8 kg	Fast to wet&dry rubbing
Colour fastness	To pass the test	—	—	—	To pass the test	—	250.0 min
Tensile strength kg/cm.	210	250 min.	—	210.0	210.0 main	210 min	1.5%
Total ash % max.	—	2.0% over chro- mium	2.0%	1.8%	1.0%	—	15.0%
Water soluble % max	—	3.0%	15.0%	10.0%	12%	10.0%	0.6
Differential No max.	—	0.7	0.6	0.6	0.6	40.6	...
Hide substance min	—	60 to 70%	—	—	—	—	45% (2 hrs.)
Fixed organic matter % by wt.	—	10 to 20%	—	45% max (2 hrs)	45% max (2 hrs)	—	45% (24 hrs.)
Water absorption % max	—	60.0% (30 mts.)	40% (2 hrs) 45% (24 hrs)	45% (24 hrs)	45% (24 hrs)	45 min-	55.0°
Degree of tannage	—	—	55% min.	55 min.	85°-80°	—	...
Apparent density	—	—	0.95 min	0.95	—	—	35.0%
Elongation, % max	—	70% max	—	—	25%+5%	50.0	70.0
Stitch tear kg./cm thickness	—	—	—	—	—	—	...
Combined oils&fats	—	—	—	—	—	—	...
Sink test	—	—	—	—	—	—	...
Weight/sq. meter	—	—	—	—	—	—	...
Shrinkage in water at 92°C	—	—	—	—	—	—	...
Resistance to hot oil at 60°C	—	—	—	—	—	—	...
Resistance to hot air at 92°C	—	—	—	—	—	—	...
Grain Strength Kg./sq. cm. thickness	—	630	—	—	—	—	...
Insoluble ash, % max.	—	—	1.0%	—	4 0.6.5 mm	Fig.-5.0% ; nopping - 75%	0.5% max.
Thickness, min	—	—	—	0.5%	0.75	...	5 mm. min
Soluble ash, % max.	—	—	—	—	—	—	...
Resistance to water at 100°C	—	—	—	—	—	—	...
Resistance to cold air	—	—	—	—	—	—	...
Shrinkage in oil % area max.	—	—	—	—	—	—	75°C min.
Shrinkage temperature	—	—	—	—	—	—	Penetration to half the thickness from grain
Colour penetration	—	—	—	—	—	—	specified
Resistance to mould growth	not specified	specified	specified	specified	not specified	not specified	specified

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Characteristics (on 14% moisture basis)	IS : 3840-1960 Lining Leather			IS : 3020-1964 Oil seal leather			IS : 1017-1966 Chamois Leather			IS : 4207-1967 Foot Ball Leather			IS : 1225-1958 Picking band
	Type I	Type II	Type III	Type I	Type II	Type III	Type I	Type II	Type III	Type I	Type II	Type III	
	1 Oils & fats percentage	8.0 max.	12.0 max.	8.0 max.	3.0-6.0	3.0-6.0	3.0-6.0	2.5-5.0	2.5-5.0	2.5-5.0	2.5 min.	3.0 min.	3.0-8.0
2 Chrome as Cr ₂ O ₃	1.5	...	3.0	...	3.0	2.5	...	...	...	3.0	1.5	...	...
3 pH min.	3.5	3.5	3.5	3.5 min.	3.5 min.	3.5 min.	...	...	...	3.2	3.2	3.5	...
4 Differential figure max.	...	...	...	0.6	0.6	0.6	...	...	...	...	...	0.6	...
5 Crackiness	...	...	...	— shall not crack —			...	...	...	Grain shall not crack			...
6 Tear strength kg./cm.	...	...	...	...	...	...	...	...	...	...	...	...	...
7 Colour fastness	to pass wet and dry rubbing			...	...	...	...	...	...	...	...	...	...
8 Tensile strength kg./cm ²	...	...	...	...	...	...	...	...	...	11 to backbone 210 210 & 190 210 & 190			Ox & Buff 320
9 Total ash percentage max.	...	...	...	2.0	8.0	8.0	3.0	5.0	5.0	...	...	1.5	...
10 Water solubles percentage, max.	...	10.0	...	10.15	...	6.0	3.0	1.0-5.0	2.0-5.0	...	4.0	15.0	...
11 Hide substance percentage, min.	40-65	40-60	65-75	...	...	...	60	60	60	...	...	...	...
12 Fixed organic matter % by wt.	...	...	...	...	...	...	...	...	...	...	...	...	...
13 Water absorption % max.	...	...	...	...	...	...	200	200	200	½ hr. 25; 2hr. 30; 24h. 35. 25,30,40. 40,45,45, 55°			...
14 Degree of tannage, min.	...	45°	...	55-70	...	65.0	...	...	...	...	...	...	...
15 Apparent density	...	...	...	...	...	...	...	...	...	...	...	...	...
16 Elongation, percentage	...	...	...	...	...	...	...	...	...	Temp. 12; Per. 4 max. 12&4 max. 12&4 max.			70% max
17 Stitch tear kg./cm.	50	50	50	...	...	...	...	...	...	70	70	70	Quality index
18 Combined oils percentage	...	...	...	...	...	...	0.5-3.0	0.5-3.0	0.5-3.0	...	...	...	1A, 2A, 3A
19 Sink test	...	...	...	...	...	...	10 Sec. to 3'; 10 sec. to 3'; 10 sec. to 3'			...	...	...	1.5
20 Shrinkage in water at 92°C % max.	...	...	...	5.0	3.0	3.0	...	...	...	...	...	...	1B, 2B, 3B
21 Resistance to hot oil at 60° C % max.	...	...	...	5.0	5.0	5.0	...	...	...	...	...	...	1.36
22 Resistance to hot air	...	...	...	flexible at 80°	100°C	100°C	...	...	...	...	...	...	2C, 3C 1.24
23 Insoluble ash, max. %	pig	6.0	5.0	7.0	1.0	7.0	PETROL FILTRATION			...	...	0.5	Buff:—
	non-pig	2.5	0.75	4.0	...	...	TEST :			2.5 mm.	2.5 mm.	2.5 mm.	1A, 2A, 3A
24 Thickness mm. (as agreed by purchaser & supplier (±0.1 mm))	...	...	...	...	...	...	...	...	...	...	...	...	1.72
25 Soluble ash percentage	...	...	...	1.0	...	...	Shall retain water for			...	...	1.0	1B, 2B, 3B
26 Resistance to water at 100°C	...	...	...	soft at 80°C	soft at 100°C	...	no less than 9 sec.			...	...	...	1.59
27 Resistance to cold air	...	...	...	— grain shall not crack —			...	...	...	...	...	...	2C, 3C
28 Shrinkage in oil, % area max.	...	...	...	15.0	15.0	15.0	...	...	...	...	...	...	1.43
29 Shrinkage in air & water, % max.	...	...	...	5.0	5	5	...	...	...	...	...	...	...
30 Shrinkage temperature in gasoline	...	...	...	2	2	2	...	...	...	...	...	...	...
31 Shrinkage temperature	...	...	...	...	...	...	...	...	...	...	...	...	...
32 Colour penetration	...	...	...	...	...	...	...	...	...	95°C	80°C	77°C	...
33 Resistance to mould growth	Specified	Specified	Specified	Not specified	Not specified	Not specified	Not specified	Not specified	Not specified	Specified	Specified	Specified	...

INTERNATIONAL SPECIFICATIONSA. OX, COW : SHOE UPPER LEATHER, (CRUST/FINISHED)

T e s t	International Standards
Tensile strength	Minimum 200 kg/cm ²
Elongation at break	Maximum 80%
Lastometer	minimum 7 mm
Resistance to tear propagation	minimum 25.49 kg/cm
Flexometer	full grain 10000 flexings corr, " 6000 "
Dry Rub 50 x)	judge from 1 - 5
Wet Rub 20 x)	1 very poor
Adhesion test)	5 excellent
Cr ₂ O ₃ content	Minimum 2.5%
Fat content	5 - 16%
Sulphate ash	Maximum 2%
pH 1:20)	Not below 3.5
Aqueous extract)	Difference value not above 0.7

INTERNATIONAL SPECIFICATIONSB. SKINS : SHEEP/GOAT, VARIOUS TYPES OF LEATHER

T e s t	International Standards
Tensile strength	Lining leather minimum 150 kg/cm ²
	Garment leather minimum 100 kg/cm ²
	Glove leather minimum 100 kg/cm ²
	Crust leather minimum 100 kg/cm ²
Elongation at break	Lining leather 150%
	Garment leather 60%
	Glove leather maximum 80%
	Crust leather maximum 80%
Lastometer	minimum 7 mm
Resistance to tear) propagation)	minimum 20 kg/cm
Flexometer	Lining 25000 flexings
	Glove 50 - 100000 "
Dry Rub)	judge from 1 - 5
Wet Rub)	1 very poor
Adhesion test)	5 excellent
Cr ₂ O ₃ content	minimum 2.5%
Fat content	maximum 10 - 18%
Sulphate ash	maximum 2.0%
pH 1:20)	Not below 3.5
Aqueous extract)	difference value not above 0.7

4. SPECIFICATIONS FOR GARMENT TYPE LEATHER

- A. German Civil Sector
 B. German Military Sector
 C. UNIDO Standards

4.1. Tensile Strength and Elongation at Break

	<u>Suede, Nubuk Anilin Nappa</u>	<u>Finished Sheep Nappa</u>	<u>Goat Nappa</u>
A. minimum	120 daN/cm ²	120 daN/cm ²	120 daN/cm ²
B. minimum	-	-	250 daN/cm ²
Elongation max. 20% at	20 daN/cm ²	20 daN/cm ²	20 daN/cm ²
C. minimum	100 daN/cm ²	100 daN/cm ²	100 daN/cm ²
Elongation max. 60%		60%	60%

4.2. Stitch Tear Resistance

A.	-	-	-
B.	-	-	-
C.	25 daN/cm	25 daN/cm	25 daN/cm

4.3. Ash Content - Water Solubles

A.	-	-	-
B. maximum	2%	2%	2%
C. maximum, excl. tanning oxides	2%	2%	2%

4.4. Resistance to Tear Propagation

A. minimum	15 daN/cm	20 daN/cm	20 daN/cm
	lamb	15 daN/cm	
B. minimum	-	-	35 daN/cm
C. minimum	15 daN/cm	15 daN/cm	15 daN/cm

4.5. Light Fastness (Xeno - textile blue scale)

A. minimum	3	4	4
B.	-	-	-
C.	-	-	-

4.6. Washability (Water - soft soap water)

- A. after washing, dry, stake, should be no change of leather character. Dye shade not below 3 of international grey scale. Size of leather max. \pm 3%
- B. same as under A.
- C. -

4.7. Dry Cleaning

- A. after drycleaning and refatliquoring, no change of leather character. Dye shade not below 3-4 of international grey scale. Size of leather max. \pm 3%
- Finished leather; if swelling binder in bottoming, finish must be fully removable, but no change of leather character. Dyeing should be ton in ton with pigment finish. Size of leather max. \pm 3%
- B. -
- C. -

4.8. Perspiration Fastness

- A. see wet rub with perspiration solution at pH 9.0
 B. minimum 3 of international grey scale
 C. - - -

4.9. pH Value - Difference NR.

- A. minimum pH 3.5) at pH below 4.0
 B. minimum pH 3.5) difference Nr. should
 C. minimum pH 3.5) not be more than 0.7

4.10. CR₂O₃ Content

- | | | | |
|------------|------|------|------|
| A. | - | - | - |
| B. minimum | 3% | 3% | 3% |
| C. minimum | 2.5% | 2.5% | 2.5% |

4.11. Fat Content

- | | | | |
|----|---|-------|-------|
| A. | - | - | - |
| B. | with dichloromethan extractables (fats etc.) max. 18% | | |
| C. | 4-10% | 4-10% | 4-10% |

4.12. Wet - Dry Rub- Perspiration Solution at pH 9.0

- | | | | |
|------------|----|----|----|
| A. dry rub | 20 | 50 | 50 |
| wet rub | 10 | 20 | 20 |
| pH 9.0 | 10 | 20 | 20 |
| B. | - | - | - |
| C. | - | - | - |

4.13. Adhesion of Finish

- | | | | |
|------------|---|------------|------------|
| A. minimum | - | 0.2 daN/cm | 0.2 daN/cm |
| B. | - | - | - |
| C. | - | - | - |

4.14. Flexometer

- | | | | |
|------------|---|---------|---------|
| A. minimum | - | 50 000 | 50 000 |
| B. minimum | - | 100 000 | 100 000 |
| C. | - | - | - |

4.15. Water Vapour Permeability (Herford)

- | | | | |
|------------|-----|-----|-----|
| A. | - | - | - |
| B. minimum | 350 | 350 | 350 |
| C. minimum | 250 | 250 | 250 |

4.16. Water Absorption

- | | | | |
|---------------------------|---------|-------------------|---------|
| A. water drop | 10 min. | 10 min. | 10 min. |
| till full penetration | | | |
| B. max. water penetration | - | 25% after 40 min. | |
| C. | - | - | - |

4.17. Chemicals Harmful to Health

- | | | | |
|----|---|---|---|
| A. | - | - | - |
| B. | leather should be free of harmful chemicals | | |
| C. | - | - | - |

ANNEX 10

C O N T E N T S

Item

1. Physical Test Instructions/
Specifications
2. Analytical Test Instructions/
Specifications

Determination of tensile strength and elongation at breakDIN specification 53 328 - February 1984Definition

- 1) The tensile test serves to establish the tensile strength and elongation at break of leather with specimens of a specified shape and clamped in a specified position.

Sampling and shape of samples

- 2) From the test pieces sampled according to DIN 53 303, dumb-bell-shaped specimens (Figure 132) 10 mm wide and 50 mm long plus the clamped areas are to be stamped parallel to the backbone. Before they are stamped out, the thickness of the specimens shall be measured accurately to the nearest 0.01 mm at three points a, b and c according to DIN specification 53 326 (see Figure 132). The cutting width of the press knife may be adopted as the fixed measurement for the width of the specimens. The cutting surfaces of the press knife must be parallel on the inside and bevelled towards the outside.

Procedure

- 3) The tensile test shall be carried out using a tensile strength machine which permits the elongation of the specimen to be read off at the same time. The temperature of the specimen and the ambient atmosphere shall be $20^{\circ} \pm 2$ deg. C. The free clamped length shall be equal to the measuring length of 50 mm and the test shall be carried out at a uniform speed of separation of 100 mm per minute.

The tension in kg (breaking load) applied to the specimen and the elongation of the specimen at the moment of failure shall be read off. The measured breaking load should not lie below 10% of the specified force measurement range.

Test report

- 4) At least two specimens are to be tested in the same way, and the mean value is to be calculated from the results of measurement. If the two values differ by more than 10% from one another, a third specimen must be tested and the result included when the mean value is calculated.

5) The test report shall state the following with a reference to this standard specification :

- a) the thickness of the sample as a mean of measurements a), b) and c) and its width in mm;
- b) the breaking load in kg
- c) the tensile strength in kg/cm^2 calculated from the breaking load and the cross-sectional area of the sample according to the equation

$$\text{tensile strength in kg/cm}^2 = \frac{\text{kg breaking load} \times 100}{\text{mm thickness} \times \text{mm width}}$$

- d) the elongation at break in % of the original measuring length calculated according to the equation

$$\text{elongation at break in \%} = \frac{\text{increase in length in mm} \times 100}{50 \text{ (measuring length in mm)}}$$

Where it was necessary to modify the shape of the sample, this must be stated in the test report.

B. Determination of resistance to tear propagation**Definition**

- 1) The determination of the resistance to tear propagation serves to establish the force which is required to propagate a tear in a strip of leather with an incision at one end.

Sampling

- 2) From the test pieces sampled according to DIN 53 303 specimens 40 mm wide and 100 mm long are to be cut parallel to the backbone. a 50 mm incision shall be made in the middle of one of the narrow edges of each specimen (at 20 mm distance from each of the long edges and parallel to these) (see Figure 137).

Procedure

- 3) The two tongues resulting from the incision (see Figure 138) are clamped each separately in the clamping devices of the tensile strength machine and subjected to a load. The ratchet on the weight lever of the tensile strength machine must previously be released so that the pointer can swing freely. The load should be increased uniformly at a rate of separation of 100 mm/minute until the incision in the specimen tears further. Tearing is continued until the leather strip is torn right through lengthwise. Should the specimen tear laterally, the test must be repeated.

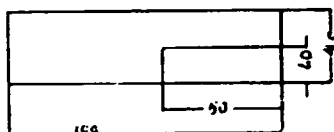


Figure 137

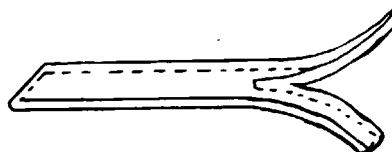


Figure 138

- 4) The mean value of the load, which fluctuates slightly over the entire period for which the tensile stress is applied, is taken as the resistance to tear propagation in kg. The mean value is obtained either by planimetric evaluation of the tear propagation graph or by calculation based on at least 5 readings taken at regular intervals.

Test report

- 5) At least two specimens are to be tested. The test report shall state the mean of the results of the two tests with a reference to this standard specification. The resistance to tear propagation is to be stated in kg/cm thickness.

$$\text{Resistance to tear propagation in kg/cm} = \frac{\text{kg mean load} \times 10}{\text{mm thickness of leather}}$$

Determination of stitch tear resistance and
resistance to tear propagation

DIN specification 53 329

Definition

- 1) The determination of the stitch tear resistance serves to establish the resistance which leather will offer under specified conditions to the tearing of a mandrel of 1 mm thickness.

Sampling

- 2) From the test pieces sampled according to DIN 53 303 strips 20 mm wide and 100 mm long are to be cut parallel to the backbone. A all, 1 mm wide and 10 mm long shall be made in the strips 5 mm from the narrow edge in the middle between the two long edges and parallel to these (Figure 135) by pressing down into the specimen a blunt, non-pointed punch (Figure 134), whose narrow edges are rounded off to a semi-circle, and stamping out a parallel-sided portion 10 mm long and 1 mm wide.

Procedure

- 3) The test shall be carried out on a tensile strength machine. Tonges (see Figure 135) with two slots are inserted in one of the clamping devices of the machine in such a way that a half-round mandrel 1 mm in width and 10 mm in height (Figure 136) can be inserted. At one end of the specimen is clamped between the jaws of the tensile strength machine. At the other end the flat mandrel is slipped through the stamped-out slot. The free clamped length, measured from one clamping jaw to the tearing point of the mandrel, shall be 60 - 70 mm. The speed of separation shall be 100 mm/min. The load in kg required to tear out the slot is measured.

Test Report

- 4) At least two determinations are to be carried out. The test report shall state the mean of the results of the two individual determinations with a reference to this standard specification. The stitch tear resistance is stated in kg/cm thickness.

$$\text{Stitch tear resistance in kg/cm} = \frac{\text{kg load}}{\text{10 mm thickness of leather}}$$

ANALYTICAL TESTACIDY IN THE LEATHER (pH)

1. 2 gramm very fine cut pieces of leather dry (exact weight)
2. Extract the leather cuttings with petrolether in a closed glass container at room temperature :

1 x 1 hour with 50 ml. petrolether, again

1 x 1 " " " " " again

1 x over night " "

3. Dry the leather at 50°C

4. Give the dry leather cuttings into a Merlenmeyer Kolben (Jena Apparate Glass with closing cut) with 100 ml. double distilled water.

(Distilled water should be produced in a quärz apparat)

keep for 1 hour and shake several times. The water solution check with pH meter, glass electrode.

If the pH is 3.5 - 4.5, dilute again 1:10 and check again the pH.

Example :

pH 3.5
1:10 pH 4.5

1.0 Difference figure

If the first pH is below 3.5 or the difference figure is bigger than 0.7, the leather contains dangerous strong free acid which will damage the leather fibre, weakening tensile strength, etc. during storing.

All glass containers should be well cleaned with boiling water before use.

Analysis of Chrome liquor or Chrome extracts : Estimation of Cr_2O_3

- (a) A stock solution of the material, under test, is prepared to contain approximately 1.g. per litre of chromium (Cr.). 25 cc. of the stock solution is transferred into a conical flask and diluted with approx. 100 c.c. water 2N caustic soda solution is added drop by drop until the precipitated chromium hydroxide formed just dissolves. Then add 20-30 cc hydrogen peroxide solution (3%). Some boiling stones are now introduced into the vessel and the contents boiled till effervescence ceases. A small funnel is suspended in the neck of the conical flask to avoid any loss due to spray. The boiled solution (yellow chromate) is allowed to cool and made up to the mark.

50 cc of the yellow chromate solution is pipetted into an iodine flask to which is now added conc hydrochloric acid in excess (about 5 c.c. excess), followed immediately by 10 cc 10% potassium iodide and leaving the closed flask in the dark for ten minutes (with intermittent stirring). The liberated iodine is now titrated with $\frac{N}{10} \text{Na}_2\text{S}_2\text{O}_3$ using freshly prepared starch as indicator (the disappearance of the blue colour indicating the end point).

$$1 \text{ cc of } \frac{N}{10} \text{Na}_2\text{S}_2\text{O}_3 = 2.5337 \text{ mg Cr}_2\text{O}_3$$

$$\text{or } 1 \text{ cc of } \frac{N}{10} \text{Na}_2\text{S}_2\text{O}_3 = 1.7337 \text{ mg cr.}$$

- (b) Determination of basicity

Add 3-4 cc of 1% phenolphthalein solution to 300 cc distilled water in a large white porcelain bowl and adjust to a faintly pink colour with a few drops of $\frac{N}{10} \text{NaOH}$ solution. Then add 25 cc of the stock solution prepared as $\frac{10}{10}$ described under (a) and titrate, with continuous stirring at the boil (to effect further hydrolyses of the chrome salt) with $\frac{N}{10} \text{NaOH}$ solution until a distinct pink colouration is obtained.

$$\text{Basicity} = \frac{A - B}{A} \times 100$$

$$A = \text{cc } \frac{N}{10} \text{Na}_2\text{S}_2\text{O}_3 \text{ for } \text{Cr}_2\text{O}_3 \text{ determination}$$

$$B = \text{cc } \frac{N}{10} \text{NaOH for acid titration described above}$$

- (c) Estimation of Chromium in leather

About 3 g of leather is ashed in a platinum crucible and melted with 4 g of a mixture consisting of equal parts of (i) soda ash, (ii) potassium carbonate, (iii) fused borax (iron and aluminium - free) for about one half hour, cooled down and the contents dissolved in hot distilled water. The solution is transferred in a measuring flask and brought to the mark with water. About 50 or 100 cc of this solution (yellow chromium) is acidified and titrated as described under (a).

Analysis of Chromium Compounds

Chrome tanning compounds are not within a variety of forms. Chromium in the trivalent condition, as used for the one-bath method of chrome tanning, is encountered as ready made extract, which may be either a solid extract of "Chrome tanning crystals", containing about 26 percent Cr_2O_3 , or as a liquid extract containing about 15 percent Cr_2O_3 .

These are common articles of commerce, or they may be made by the tanner himself. Chrome tanning liquors, as used in the tannery, also often require analysis, especially in well controlled tanneries. Chrome alum, which may contain potassium, sodium or ammonium sulphates, is also used in certain cases where it is made basic by addition of alkali such as soda ash. Chromium in the hexavalent condition is met with in the two bath tanning process and as bichromate which is employed as a raw material in the manufacture of chrome tanning extracts and liquors. The following are the most important determinations that should be carried out on chrome extracts and liquors :

1. The chromium content, which is usually stated as percent Cr_2O_3 .
2. The acid combined with chromium, usually stated as percent SO_4 .
3. The basicity, which is obtained from the two determinations above calculation.
4. The neutral salt content, usually sodium chloride and sodium sulphate.
5. The distribution of the sulphate groups in basic chromium sulphate liquors.
6. The pH value of the solution, at definite concentration.
7. The degree of "olation" of the hydroxyl groups in the basic chromium complex.
8. The precipitation point value (McCandlish test).
9. The content of iron and aluminium.
10. Specific gravity.

Determination of Chromium

This determination depends upon the oxidation of the trivalent chromium into hexavalent condition, and the subsequent liberation of iodine from potassium iodide, which is then titrated with sodium thiosulphate.

For this and subsequent determinations a solution containing about 1 percent chromium is desirable. If solid chrome tanning extracts are being analysed, about 15 gm. should be accurately weighed out, dissolved in distilled water, and made up to 250 cc. in a graduated flask. Liquid chrome tanning extracts should also be weighed out (not pipetted) about 25 gm. being diluted to 250 cc.

For this stock solution, containing approximately 1 per cent chromium, 25 cc is pipetted into a conical flask, and N/1 sodium hydroxide added until the precipitate which first forms re-dissolves, and immediately 20 to 30 c.c. of 3 per cent. (10 volumes) hydrogen peroxide is added, and the flask and contents heated over a Bunsen until the whole of the peroxide is decomposed. There should now be no sign of effervescence in the liquid, large bubbles only being formed. The solution should now be a pure yellow in colour due to the formation of potassium chromate. The solution so obtained is filtered into a 250 c.c. graduated flask, the filter-paper thoroughly washed with hot distilled water, and the contents of the flask, after cooling, being made up to the mark.

50 c.c. of the above solution is now pipetted into a clean, dry stoppered bottle, neutralised with hydrochloric acid, 5 c.c. of concentrated hydrochloric acid added and also 10 c.c. of 10 percent potassium iodide, allowed to stand a few minutes with shaking at intervals and the iodine titrated with N/10 sodium thiosulphate.

- I) $\text{Cr}(\text{OH})\text{SO}_4$ plus 2NaOH : $\text{Cr}(\text{OH})_3$ plus Na_2SO_4
 II) $2\text{Cr}(\text{OH})_3$ plus 4NaOH plus $3\text{H}_2\text{O}_2$: $2\text{Na}_2\text{CrO}_4$ plus $8\text{H}_2\text{O}$
 III) $2\text{Na}_2\text{CrO}_4$ plus 16 HCL plus 6 KL : 6I Plus 2CrCl_3 plus
 IV) 6I plus $6\text{Na}_2\text{S}_2\text{O}_3$: $5\text{Na}_2\text{S}_4\text{O}_6$ plus 6 NaI

1 c.c. N/10 $\text{Na}_2\text{S}_2\text{O}_3$ corresponds to 0.00173 gm Cr. (or) Cr_2O_3

If iron compounds are present the ferric hydroxide will be left on the filter-paper, from which it may be dissolved and the iron determined colorimetrically. It must be filtered off, however, and not left in the chrome solution as otherwise the ferric chloride formed on acidification would also liberate iodine, as has been indicated above.

The method described in as improvement on the older method of oxidation with sodium peroxide, and the oxidation proceeds more smoothly. The use of sodium hydroxide and hydrogen peroxide was suggested by Schorlemmer. There is still a difficulty with the decomposition of the excess of peroxide, especially with used liquors. Various suggestions have been put forward to overcome various difficulties.

Innes has shown that decomposition of excess peroxide is materially hastened by boiling for a few minutes with a small piece of clean iron until it "rattles" against the glass of the flask. The piece of iron is removed prior to filtration. The simultaneous determination of iron is vitiated by this treatment. Kubelka and Wagner oxidise, as described above, until the pure yellow of sodium chromate is obtained. They then remove the excess of peroxide by adding a solution of potassium permanganate drop by drop as long as manganese dioxide is precipitated. The excess of permanganate should be as little as possible, and is finally removed by the addition of drops of alcohol, the mixture being well shaken until all gas evolution has ceased.

Feigl suggests oxidising as above with sodium hydroxide and hydrogen peroxide, the solution boiled until pure yellow, and then about 5 c.c. of 5 percent nickel nitrate solution is added very slowly and with

precautions taken to avoid excessive nitrate solution is added very slowly and with precautions taken to avoid excessive frothing. The solution is then boiled for 3 minutes, filtered, and made up to the mark as described above.

A second method due to Feigl and his co-workers is as follows: A quantity of filtered chrome solution containing 0.02 to 0.04 gm Cr. is treated with excess of sodium hydroxide (about 10 c.c. of 20 percent NaOH. 25 - 30 c.c. of saturated bromine water is then added and the mixture boiled about five minutes until completely yellow. Next 10 c.c. of approximately 2 percent potassium thiocyanate solution is added and the solution again boiled for $\frac{1}{2}$ to 1 minute. The solution is cooled, potassium iodide added, followed by excess of sulphuric acid. Care must be taken to add the acid after the iodide otherwise some reduction takes place. In the presence of iron, acidity with phosphoric acid instead of sulphuric acid. In the case of liquors containing protein small quantities of white precipitate sometimes appear during the oxidation but the titration of the iodine is not affected. The liberated iodine is titrated in the usual way with N/10 sodium thiosulphate.

The above method for the determination of chromium has been adopted by the I.S.L.T.C. as an official method. For fresh liquors the excess of peroxide must be decomposed by the Imes iron method or the Kubelka-Wagner method, whilst for used liquors the Feigl bromine method is official.

Sometimes used liquors contain so much material derived from the hides and skins that it is almost impossible to oxidise thoroughly, the solution never becoming a bright yellow colour, and the iodine starch blue colour in the final titration often showing a tendency to return. In such cases there is really no alternative but to evaporate down and ignite. The procedure is quite analogous to that described for the analysis of chrome leather. A useful way of achieving success in such cases is to evaporate the liquor down to small bulk in a platinum dish, add the mixture of sodium carbonate, potassium carbonate, and Dora glass, continue the evaporation to dryness, and finally to fuse as in leather analysis.

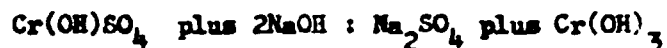
Liquors made by the reduction of bichromate with sodium thiosulphate may contain an excess of this salt. Often it is found difficult to obtain good results by oxidising in the ordinary way. Better success may be achieved by oxidising with bromine water, taking care to boil off the excess of the latter (use a fume chamber).

Determination of Acid combined with Chromium

The familiar Procter-McCardish method is used for this determination, with a modification introduced by Burton and Hey. It depends on the fact that chromium salts hydrolyse in aqueous solution with the formation of basic salts and free acid. By constant removal of the acid as it is formed, by addition of alkali, chromium hydroxide is precipitated. As chromium forms relatively stable basic sulphates it is necessary for the titration to be finished at the boil. The method is not reliable in the presence of magnesium salts, where much more alkali is needed to develop a pink to phenolphthalein than corresponds to the theoretical amount when this method is tested on known amounts of chromium salts of definite composition. No method of analysis to avoid this peculiar action of

magnesium salts is as yet available. A word of warning should be given when samples of chrome alum are being analysed. With the advents of cheap synthetic ammonium sulphate it will be found that many samples of chrome alum or the double sulphate of chromium and ammonium. Now in this determination for the amount of acid combined with chromium ammonium salts will have as if they were acid, and quite false results may easily be obtained. It is, therefore, always advisable to test for ammonium salts and if found to be present the ammonia should be determined and allowed for in the calculation of basicities.

The stock solution of the chrome extract or liquor containing approximately 1 percent. Chromium is used. 25 c.c. of this solution is pipetted into a fairly large porcelain dish, diluted with about 300 c.c. of distilled water and 4 c.c. of 1 percent phenolphthalein solution. This is then titrated with N/2 sodium hydroxide solution until a pink colour is produced, this titration being carried out in the cold. The solution is now raised to the boil and the titration continued, for the boiling will have brought about further hydrolysis of the basic chromium salt initially precipitated. When nearing the end-point the Bunsen burner should be removed, and the titration completed. A greyish violet tint of the well-stirred liquid or a distinct pink seen on the side of the basin after allowing the precipitate to settle are evidences of the completion of the titration. It must be realised that a little experience is necessary to carry out this titration successfully as the colour of the precipitated chromium hydroxide is liable to obscure the end-point. The result may be calculated as percentage of SO_4 combined with chromium.



1 c.c. N/2 NaOH corresponds to 0.024 gm. SO_4

Calculation of Basicity

The basicity of chrome liquors is defined by Schorlemmer's expression :

$$\frac{\text{Percent Chromium equivalent to hydroxyl groups} \times 100}{\text{percent total chromium}}$$

This type (system) which has been adopted as official by the various societies of leather chemists, has the merit of showing an increasing value as the chrome compounds are more basic. The older form of expressing basicity was as gm. of SO_4 combined with 52 gm. of chromium so that the basicity figure for chrome alum was 144, whilst that of chromium hydroxide was zero. The percentage method is so much more rational that it was not a matter of surprise that it should have been adopted all over the world. Nevertheless, a considerable volume of the older literature embodies the old method of stating basicity so that a means of converting into the new form is desirable.

By means of the two following equations it is possible to convert old into new basicities and vice versa.

Call the old basicity "X" and the new basicity "B"

then to convert old into new B :

$$\frac{(144-x) \times 100}{144}$$

and to convert new into old : $X = \frac{(100-B) \times 144}{100}$

If desired the interconversions may be carried out graphically. On a piece of squared paper draw the two axes of co-ordinates. Calling the point of origin zero, set out vertically divisions corresponding to the new percentage basicity, 0 to 100 percent. As abscissae set out the old values of basicity, 0 to 144. Join the points (100 new 0 old) and 0 new, 144 old) by a straight line and then any value of either form of expression of basicity may be read in terms of the other form of basicity value.

The calculation from analysis is very easy indeed.

Suppose in the chromium determination the value of the number of c.c. N/10 sodium thiosulphate is a c.c. This is the amount of thiosulphate equivalent to the chromium in one-fiftieth of the original amount of chrome liquor or extract weighed out. Call the number of c.c. N/2 sodium hydroxide used for titration of the combined acid b c.c. This is equivalent to the combined acid in one-tenth of the original amount of chrome extract weighed out. It will be readily seen that a and b really refer to the same quantities of chrome liquor since $N/2 = 5 \times N/10$

The basicity is then given by : $\frac{(a-b) \times 100}{a}$

Cr₂O₃ in chrome waste liquorsAnalytical test by acid oxydation

Take 25 - 35 ml. of the chrome waste liquor,

dilute with 100 ml. water,

add approx. 10 gr. ammoniapersulphate

6 drops silver nitrate N/10 solution

30 ml. sulphuric acid 20 vol. %,

heat up slowly and boil for 30 minutes

cool down, add 10 ml. Potash Iodine 10% solution

and keep in closed bottle approx. 10 minutes in a

dark room.

Titration with N/10 Sodium thiosulphate solution with

addition of starch (2%) will follow.

1 ml N/10 sodium thiosulphate solution = 0.00253 gr. Cr₂O₃

Remarks

- 1) Everything should be taken in ml., only ammoniapersulphate in gr.
- 2) According to the concentration of the chrome waste liquor, 5 - 50 ml. waste liquor should be taken.

METHOD FOR THE DETERMINATION OF OILS AND FATS

20 gm. of the well mixed sample replaced in a Soxhlet apparatus, including a weighed flask, lightly packed and extracted with petroleum ether (b.p. below 50°C) until free from grease. The solvent is distilled off the fatty residue, which is dried, at a temperature of approximately 100 c.c. in a steam-oven for 5 hours. The flask is then cooled and weighed. The extracted leather is completely freed from solvent by spreading out on a clean surface and leaving exposed to the air, but should not be heated on a water-bath or in a hot oven.

Note 1 : A specified time limit is not a sufficiently accurate criterion as to the completeness of the extraction. Syphoning every 10 minutes for 4 hours is usually sufficient. In any case of doubt a further extraction should be carried out with a fresh flask and fresh petroleum ether.

Note 2 : For carried leathers or those which are known to contain large amounts of fats, less than 20 gm. may be taken, but where water soluble matter has subsequently to be estimated, at least 20 gm. must be extracted, either in one or more operations.

Note 3 : It is impossible to obtain absolute constancy in the weights of fatty residues, owing to volatility and chemical changes.

ANNEX 11C O N T E N T SSELECTION INSTRUCTION MANUAL

Leather Factory No.1 Rangoon

Item

- A. Raw Materials : For Tannery
 - 1. Hides
 - 2. Skins
- B. Ex Lime : For Suitable Purpose
 - 1. Hides
 - 2. Skins
- C. Ex Wet Blue : For Export
For Suitable Purpose
 - 1. Hides
 - 2. Skins
- D. Ex Crust : For Export
For Suitable Purpose
 - 1. Hides
 - 2. Skins
- E. Ex Finishing : For Export
 - 1. Hides
 - 2. Skins
- F. Ex Finishing : For Local Market
 - 1. Hides
 - 2. Skins
- G. Raw Materials : For Export
 - 1. Hides
 - 2. Skins
- H. Specification : Ex Wet Blue 4 Grades for
Export
- I. Specification : Ex Crust/Finished 7 Grades
For Export
- J. Specification : Ex Raw Material 2 Grades
For Export

A. Raw materials for tannery

1. Hides : cow and buffalo (wet salted)

proper sizing :

up to 11 kg light weight
 12 - 15 kg medium
 above 16 kg heavy

Very low selection quality, not suitable for upper leathers, should be taken out for the sole leathers tannery.

2. Skins : Goat and sheep (wet salted)

proper sizing by length in 3 grades :

up to 30" small size
 30"-33" medium size
 above 34" large size

Even if the quantities are small, sheep and goats skins should be separated.

B. Ex Lime selection for suitable purpose

1. Hides : Cow and Buffalo

- A. No selection is possible at present, as all the hides are not removed from the drums until after chrome tanning.
- B. This selection is only possible in future after ex lime fleshing and splitting.
- C. Also there is no equipment available at present for any reliming (timing) etc.
- D. Football leather (Heavy butts only, without bellies and shoulders)

2. Skins : Goat and Sheep

Should be selected for the suitable purpose, followed by relining of approx./days :

1. Shoe uppers	Goat/Sheep	1 day
2. Shoe suede	" / -	1 day
3. Crust for export	Goat/sheep	1 - 2 days
4. Leather goods, full grain	" / "	1 - 2 days
5. Leather goods, suede	" / -	1 - 4 "
6. Boxing gloves	- / sheep	2 - 4 "
7. Garment suede	Goat/ -	2 - 4 "
8. Shettle cock leather	- / sheep	1 - 2 "
9. Lining leather	Goat/sheep	1 day
10. Shrunken Grain	Goat/ -	1 - 2 days

This ex-line selection also is not possible at present as no equipment is available to do this necessary relining (timing) for various kinds of leather.

C. Ex wet blue selection and sizing : for export/for suitable purpose

1. Cow/ox/buffalo

Light weight : Hides, full hides, unsplit

Selection -/15/40/45/-

" -/12/35/53/-

-/-/-/-/100

or according to order specification

Medium weight : Hides, full hides or sides

Selection -/12/35/53/-

" -/10/35/55/-

" -/-/-/-/100

or according to order specification

Heavy weight : (full hides or sides)
(unsplit or split after chrome tanning in sides)

Selection -/15/40/45

" -/10/35/55/-

" -/7/35/58/-

" -/-/-/-/100

" -/-/-/-/100

or according to order specification

2. Skins : Goat and sheep

Suitable quality for the purpose :

1. Shoe uppers, full grain	Goat/sheep
2. " " suede	" / -
3. Crust for export	" / -
4. Leather goods, full grain	" / sheep
5. " " suede	" / -
6. Boxing gloves	- / sheep
7. Garment suede	Goat / -
8. Shuttle cock leather	- / sheep
9. Lining	Goat/sheep
10. Shrunken grain	" / -

After the lime selection, a re-selection is possible to upgrade still some skins into another suitable item.

For export

Wet blue Goat, 50 - 60 sqf per dozen

Sel. -/5/16/33/46

Sel. -/-/-/-/100

Wet blue Sheep, 50 - 60 sqf per dozen

Sel. 4/6/10/20/25/35

D. Ex crust for export1. Hides : cow/ox/buffalo

If the hides are already selected ex "wet blue" still a re-selection is possible according to the requirement (or also for local use.)

Light weight substance 1.2 - 1.4 m/m full hides

medium " " 1.5 - 1.6 m/m sides

heavy " " 1.7 - 1.8 m/m sides

Selection 5/20/30/45/-/-

-/-/50/50/-/-

-/-/-/-/50/50

-/-/-/-/-/100

Selection is depending on export orders. Crust can be in light, natural or any colour shade, like black, brown, grey, beige, etc.

2. Skins : Goat and sheep

If the skins are already selected ex "wet blue" still a re-selection is possible.

For export

1. Goat crust : 50 - 60 sqf/dozen

Selection - -/10/30/60

Selection . -/-/-/-/100

2. Sheep crust : 50 - 60 sqf/dozen

Selection - -/35/29/21/15

3. Goat/sheep for lining : 50 - 60 sqf/dozen

No selection, mixed quality

E. Finished leather for export

1. Hides : Cow/Buffalo

Substance 1.2/1.4 m/m

1.5/1.6 m/m

1.7/1.8 m/m

Smooth grain for shoe uppers, normal type / softy, or "zug grain" embossed uppers (Army type quality). Selection according to order specification.

Similar as crust selection.

Colour shades on request.

2. Skins

Goat skins : A) Shoe upper leather

B) Shoe suede

C) Garment suede

D) Lining leather

Selection according to order specification, similar as crust selection

Sheep skins: A) lining leather

Colour shade on request.

F. Finished leather for local market**1. Hides : Cow/Buffalo**

Substance: : 1.2 - 1.4 m/m)
 1.5 - 1.6 m/m)for shoe uppers
 1.7 - 1.8 m/m)

Smooth grain, normal, softy
 "zug grain" army type quality
 colour shade, on request

Leather for Leather Goods Factory)
 Splits for Industry gloves and) PFF(Indaing)

2. Skins : Goat/sheep

Goat skins : A) Shoe uppers,
 B) Shoe suede
 C) Garment suede
 D) Lining leather
 E) For Leather Goods Factory full grain
 F) " " " " suede

Sheep skins: A) Boxing gloves
 B) Lining leather
 C) For Leather Goods Factory, full grain
 D) Jacket Garment Leather

Colour shade on request

G. Raw materials for export**1. Hides : Ox/cow and buffalo, wet salted :**

Ox/cow : 12 - 15 kg. medium weight range
 (approx. avg. 13.5 kg. per piece)

16 - up kg. heavy weight range
 (approx. avg. 18 kg. per piece)

Selection : 50/50, first/second grade.

Buffalo : 27 - 36 kg medium weight range
 (approx. avg. 31 kg per piece)

36 - up kg. heavy weight range
 (approx. avg. 40 kg per piece)

Selection : 60/40 first/second grade

2. Skins : Goat skins, dry salted :

Size : 26 inches up (minimum 26 inches)

Selection : 60/40 first/second grade

Weight : Approx. 86 - 95 kg per 100 pieces (in 1 bundle)

H. Specification for "wet blue"

Cow/Buffalo hides and Goat skins : 4 grades

- Quality 1 : Standard pattern, uniform colour. Free from cuts and holes in the butt, few only near the edge, belly or shoulder. Grain, free of defects in the butt, few near the edge, belly or shoulder.
- Quality 2 : Standard pattern, fairly uniform colour. Fairly free from cuts and holes in the butt, few only near the edge, belly or shoulder. Few grain defects in butt, belly or shoulder.
- Quality 3 : Standard pattern, some uneven colour spots. Few holes and cuts in the butt, belly or shoulder. Some grain defects in butt, belly or shoulder.
- Quality 4 : Standard pattern, uneven colour spots. Approx. 4 cuts or holes in butt, belly or shoulder
- Rejects Approx. 6-8 grain defects in Butt, belly or shoulder
- Full hides, unsplit
 Half hides, " or split
 Goat skins, unshaved

I. Specification for "crust" and finished leather

Cow/Buffalo hides and Goat skins, 7 grades

- Quality 1 : Standard pattern, uniform colour, free from cuts and holes in the butt, few only near the edge, belly or shoulder. Grain free of defects in the butt, few near the edge, belly or shoulder.
- Quality 2 : Standard pattern, uniform colour, fairly free from cuts and holes in the butt, few only near the edge, belly or shoulder. Few grain defects in butt, belly or shoulder.
- Quality 3 : Standard pattern, few uneven colour spots. 1 - 2 holes and cuts in the butt, belly or shoulder. Some grain defects in butt, belly or shoulder.
- Quality 4 : Standard pattern, few uneven colour spots. 2 - 3 holes and cuts in the butt, belly or shoulder. 2 - 3 grain defects in butt, belly or shoulder.

Quality 5 : Standard pattern, some uneven colour spots.
 3 - 4 holes and cuts in the butt, belly or shoulder
 3 - 4 grain defects in butt, belly or shoulder.

Quality 6 : Standard pattern, some uneven colour spots.
 4 - 5 holes and cuts in the butt, belly or shoulder
 4 - 5 grain defects in the butt, belly or shoulder.

Quality 7 : Some without standard pattern, uneven colour spots.
 5 - 7 holes and cuts in the butt, belly or shoulder
 5 - 7 grain defects in the butt, belly or shoulder

Natural or any colour shade

Full hides : 1.2 - 1.4 m/m

Sides : 1.2 - 1.3 / 1.5 - 1.6 / 1.7 - 1.8 m/m

Goat skins : 0.8 - 1.2 m/m or unshaved

J. Specification for raw materials

1. Ox/cow/buffalo

Quality 1 : Sound and fully preserved, standard pattern.
 Free of deep cuts and holes in the butt, few
 in belly or shoulder. Free of scars, scratched
 and abrasions in the butt, few near the edges,
 belly or shoulder. No hair slip.

Quality 2 : Sound and fully preserved, standard pattern.
 One small deep cut or hole in the butt, few
 in belly or shoulder. No hair slip.

ANNEX 12

C O N T E N T

Item

1. Main Chemical Parameter

MAIN CHEMICAL PARAMETER

ITEM	NAME	PRIORITY			TO BE USED IN PROCESS
		1	2	3	
1.	Common salt	x	-	-	preservation of raw hides/skins. In pickle process
2.	Garmin K	x	-	-	Bactericide for soaking, Tanning and Retanning process
3.	Preventol L	x	-	-	
4.	Amollan A conc	x	-	-	
5.	Cismollan BH	-	x	-	wetting agent in soaking, degreasing of pelt and wet blue stock soaking agent for dry raw hides / skins
6.	Caustic soda	-	x	-	small quantity for soaking fully dry hides / skins
7.					
8.					
9.	Lime stone	-	x	-	for slaking lime, if no hydrated lime powder is available
10.	Hydrated lime powder	x	-	-	Liming, and Reliming process
11.	Sodium Sulphide Flakes	x	-	-	Liming - lime paint - process to destroy the hair / wool
12.	Sodium Hydrogen Sulphide Solid	x	-	-	Liming - lime paint - process to destroy the hair / wool to
		x	-	-	Replace approx 1/3 of sodiumsulphide to avoid to heavy plumpung of the pelt in liming process
13.					
14.	Ammoniumsulphate	x	-	-	Deliming agent
15.	Sodium Bisulphite	x	-	-	Deliming agent with bleaching effect
16.	Decaltal N	-	x	-	" " only for high class quality leather
17.	Oropon OR	x	-	-	Bating agent for hides and skins
18.	Formic Acid	x	-	-	for pickle and fixation after dying - fatliquoring
19.	Sulphuric Acid	x	-	-	
20.	Oxalic Acid	-	x	-	for bleaching sole leather or chrome leather for white
21.	Chromosal B	x	-	-	for chrometanning
22.	Sodium Dichromate	x	-	-	for chrometanning after self reduction from 6+ to 3+

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ITEM	NAME	PRIORITY			TO BE USED IN PROCESS
		1	2	3	
23.	Sodium Bicarbonate	x	-	-	For basification in chrometanning, neutralization
24.	Calcium Formate	x	-	-	For neutralization
25.	Neutrigan P4	-	-	x	Sodium formiate, for hight class quality leather only in neutralization
26.	Tanigan PC	x	-	-	Change of charges in neutralization with neutralizing action
27.					
28.					
29.	Relugan RE	x	-	-	Resin retanning agent-resulting tight grain, for cow-Buff-Goat Sheep
30.	Baytigan AR	x	-	-	" " " " " " " " " "
31.					
32.	NGU/Byebark extract	-	x	-	Local products for very low quality leather Items
33.	Tanigan LD	x	-	-	Synthtic retanning agents " " " " "
34.	" OS	x	-	-	" " " " "
35.	Basyntan D	x	-	-	" " " " "
36.	Pellutax	-	x	-	" " " " "
37.					
38.	Lipamin liquor NO	-	x	-	Cationic fatliquor for topping or suede, on end of retanning, or also in chrometanning
39.	Mimosa extract	x	-	-	Vegetable retanning agent
40.	Olinor NL	x			Synthtic raw oil for fatliquor combination
41.	Coripol ICA	x			" " " " " " with antimould properties
42.	Lipoderma liquor 1C	x	-	-	Fish oil fatliquor
43.	Olinor 77	x	-	-	Synthetic "
44.	Coripol BZN	x	-	-	Lanolin "
45.	" VSL	x	-	-	Lanolin-synth-fish oil combin, fatliquor

ITEM	NAME	PRIORITY			TO BE USED IN PROCESS
		1	2	3	
46.	Coripol DXL	x	-	-	Lanolin synth neatsfoot oil combin fatliquor
47.					"
48.	Pellian S	x	-	-	Emulsifier for fatliquor combinations
49.	Derminol fur liquor HSP	x	-	-	In tanning process: goatskins, to avoid bundling for fur and reptile skins
50.	Nigrosine	x	-	-	Black dye for drum dyeing
51.	Luganil dyes	x	-	-	Diff. colours for drum dyeing
52.	Liquor of ammonia	-	x	-	For pH adjustment in penetration dyeing
53.	Eucosolar dyes	-	x	-	For anilin finishing, which will be required very seldom
54.	Lepton pigments	x	-	-	" " pigment paste for finishing,
55.	Eukanol "	x	-	-	" " " " " "
56.	Shading Black	x	-	-	Black " " " "
57.	Bright black paste	-	x	-	Partly used for matching with shading black
58.	Corial Binder V'	-	-	x	Sometime for finishing skins required
59.	Corial Binder OHN	x	-	-	Polymerised Binder, very soft for base coats
60.	" " OBN	x	-	-	" " med. soft, for top coats
61.	Encryl E	x	-	-	" " " " " base and top coats
62.	Astacin soft PU	x	-	-	" " " " " " " "
63.	" " PUD	x	-	-	
64.	Binder AN	x	-	-	to be used in combination with other binders, base or top
65.	Luron binder U	x	-	-	Casein type binder for top coats and seasoning
66.	Formaldehyde	x	-	-	For fixation of casein
67.					
68.	Lepton wax A	x	-	-	For softening the film in base coats

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0
03

ITEM	NAME	PRIORITY			TO BE USED IN PROCESS
		1	2	3	
69.	Lepton filler B	x	-	-	for soft filling in base coats
70.	Corial wax G	x	-	-	for softening the film in base and top coats
71.	Corial EM finish G	x	-	-	Nitrocellulose emulsion, water soluble for seasoning
72.	Isoderm EM finish LA	x	-	-	" " " " " "
73.	Amesol paste D	x	-	-	to adjust viscosity for rollercoating
74.	Amollon IP	-	x	-	Penetrator for impregnation of corrected grain leather
75.	Binder IF	-	x	-	Binder for " " " " "
76.	Luron lustre E	x	-	-	For brilliant rotory seasoning
77.	Ethyl glycol	x	-	-	solvent for finishing
78.					
79.					
80.	Baysel C	x	-	-	Peltconditioning agent for rapid tannage of soleleather/vegetable leather
81.	Tanigan RFS	x	-	-	Special syntan " " " " "
82.	Tanigan CV	x	-	-	Chrome containing pretanning Agent " " " "
83.	Tanigan BL	-	x	-	Bleaching agent for any vegetable tanned leather
84.					
85.					
86.					
87.	Neosyn PFX	-	-	x	Can be used in retanning
88.	Per Bristol U	-	-	x	Raw oil for fatliquor combination, <u>very small</u> quantities
89.					

ITEM	NAME	PRIORITY			
		1	2	3	
90.	Sodiumpentachlorphenate	-	x	-	Against mould and bacterias
91.					
92.					
93.					
94.					
95.					
96.					
97.					
98.					
99.					
100.					

310

REMARKS : PRIORITY No.1,Items which are always required for the standardised process

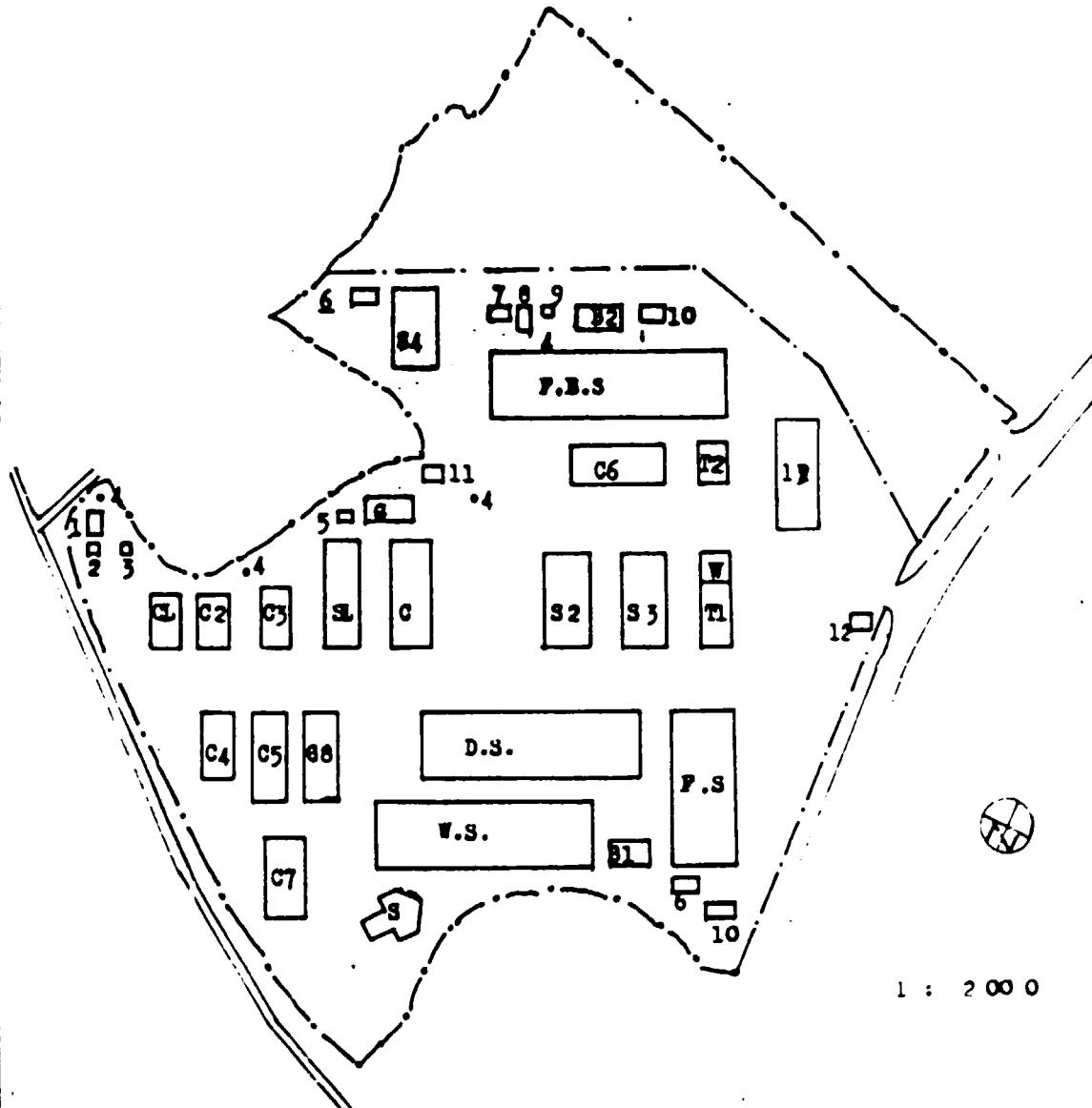
" " 2.Items which are also required for other types of leather

" " 3.Items which are required for experiments-development-

ANNEX 13C O N T E N T SItem

1. LF(R)1 Layout Plan for the Future
2. Lime Yard, Tanning and Retanning Section
3. Drying Section
4. Finishing Section
5. Process Flow Chart
6. Building Plan for Paddles from Wood or Cement

I. LEATHER FACTORY RANGOON LAY OUT PLAN FOR THE FUTURE



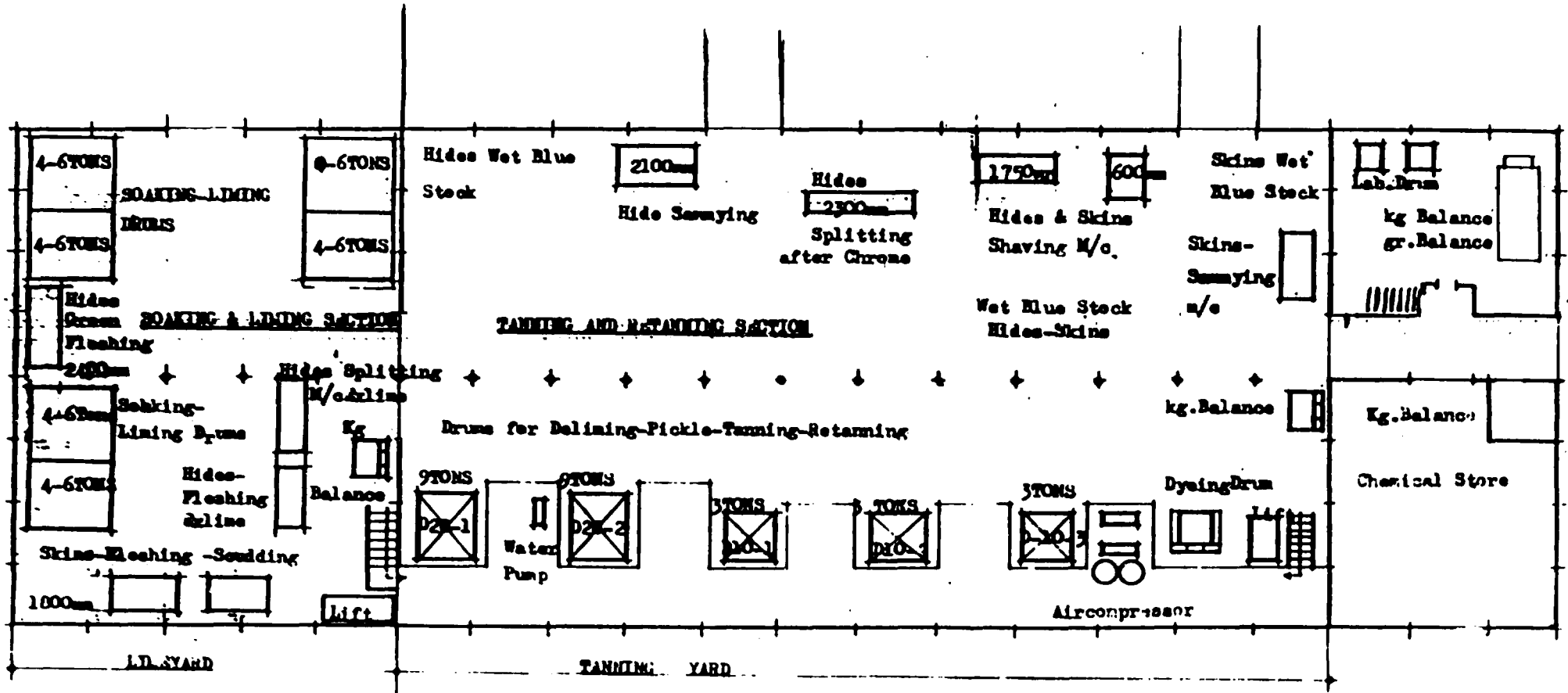
- WS -Wet Section 240'X80'
- DS -Drying Section 240'X80'
- FS -Finishing Section 100'X100'
- S -Sedimentation Tank
- G -Underground Tank 60000 gals.
- Bl -Boiler & Aircompressor House
- T1 -Transformer House 6.6/.42 KV
- T2 -Transformer House 33/6.6 KV
- C2 -Chemical Store 60'X40'
- C7 -Line & Salt Store 90'X40'
- 1 -Surface Tank 10000 gals.
- 2,5-Pump & Compressor House
- 3 -Over Head Tank 5000gals.
- 4 - 6"Tube well - 3 Nos.
- 6 - Toilet
- 10 - F/O Tank 10000 gals.
- S3 - Finished Goods Store 90'X90'

- W - Work Shop 40'X40'
- C1 - Chemical Store 1 - 60'X40'
- C3 - Chemical Store 3 - 70'X40'
- C4 - Chemical Store 4 - 60'X40'
- C5 - Chemical Store 5 - 40'X100'
- C8 - Raw Hide & Skin Store 40'X100'
- Sl - Finished Goods & Spare Parts Store 40'X100'
- S2 - Finished Goods store 50'X100'
- C - Canteen
- S4 - Finished Fiber Board Store 50'X90'
- S6 - Chemical store for Fiber Board
- Bl - Boiler & Aircompressor House
- FBS- Fiber Board Section
- 12 - Gate House
- 13 - Office
- 11 - Over Head Tank 10000 gals.

II. RADIATION:

LIME YARD

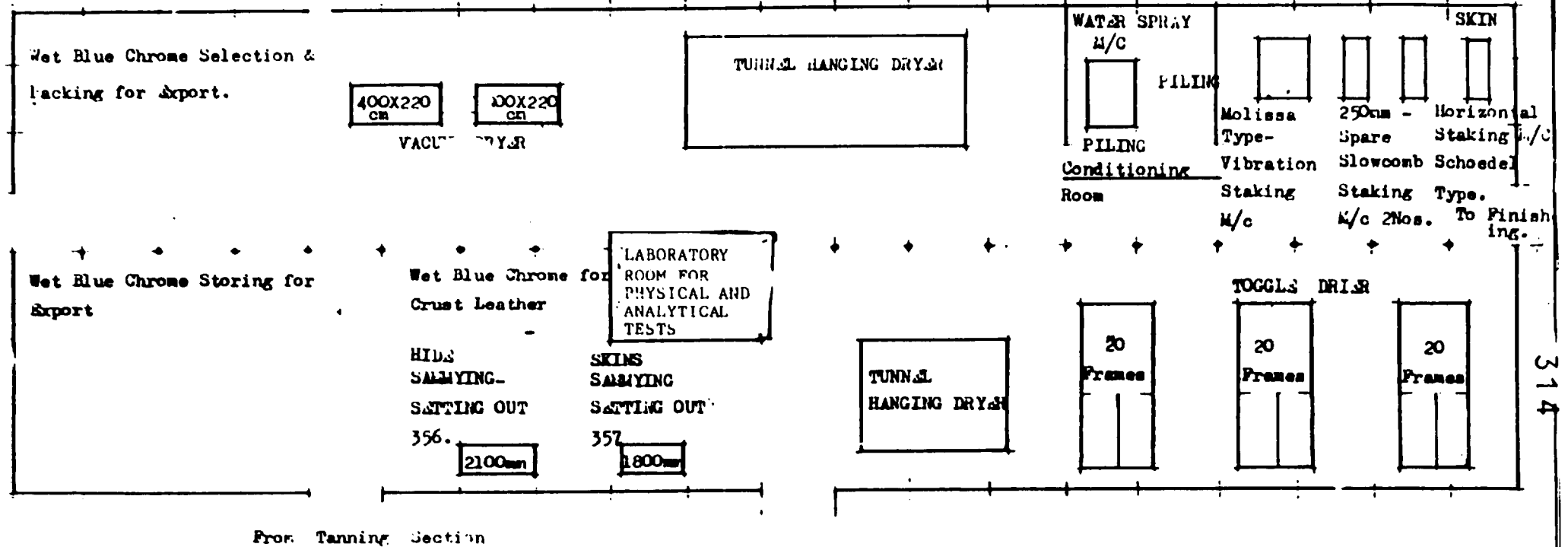
TANNING / RETANNING SECTION



31.5

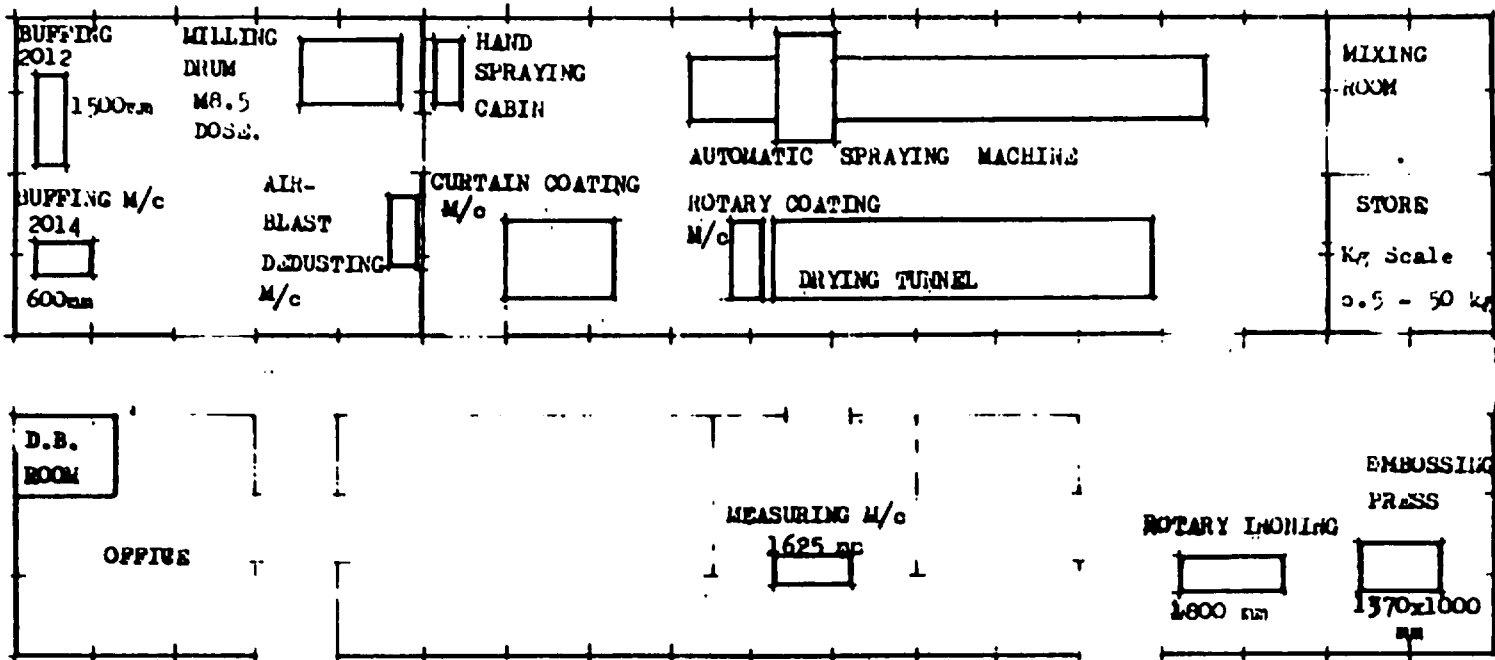
III.
RECOMMENDATIONS:

DRYING SECTION



**IV.
RECOMMENDATIONS:**

FINISHING SECTION



From Toggling

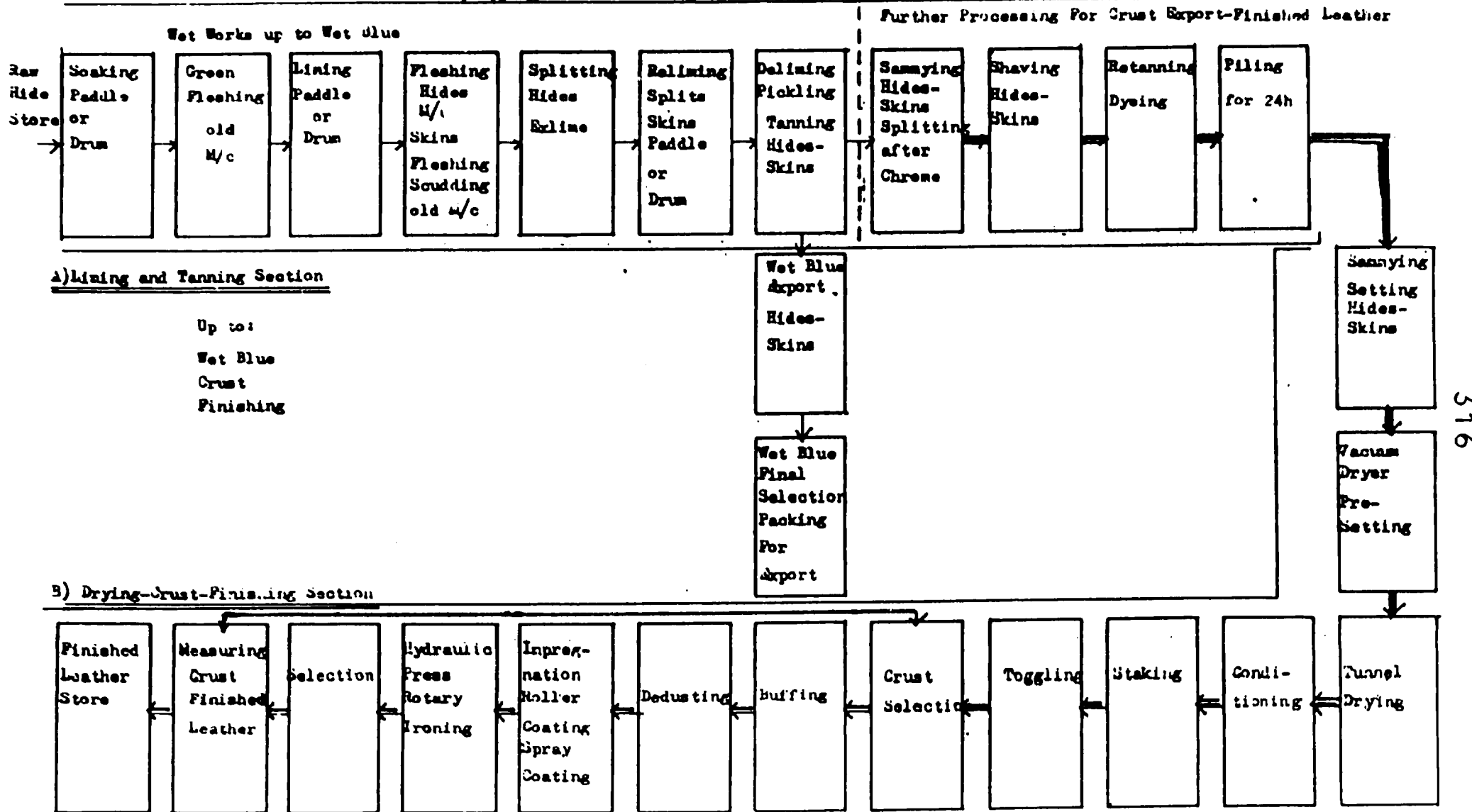
Remarks:

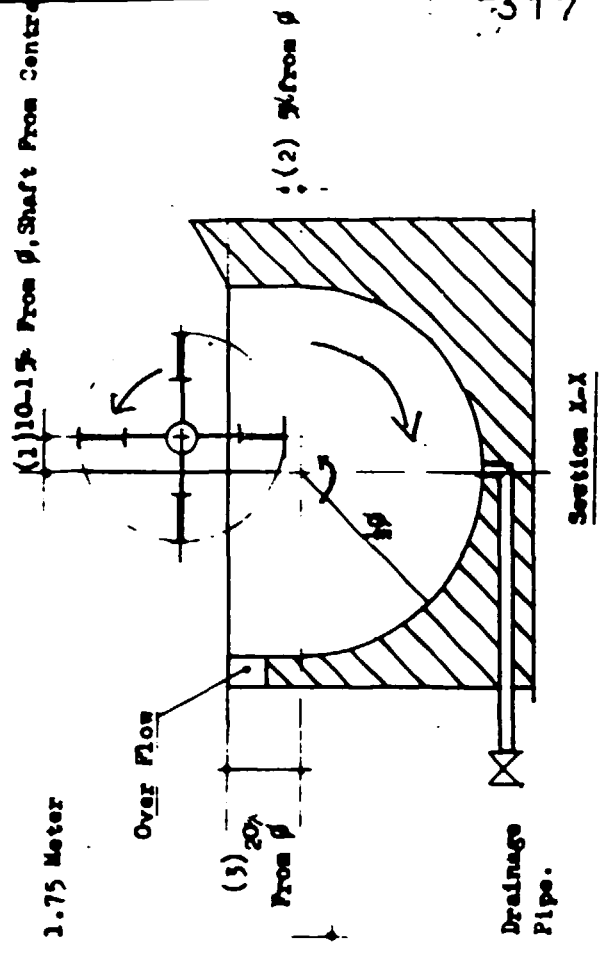
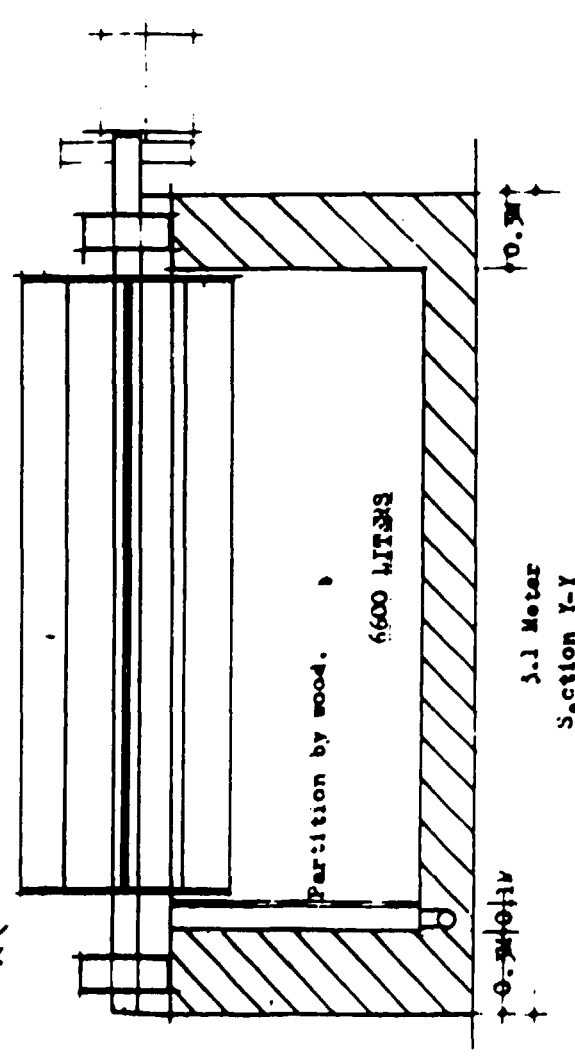
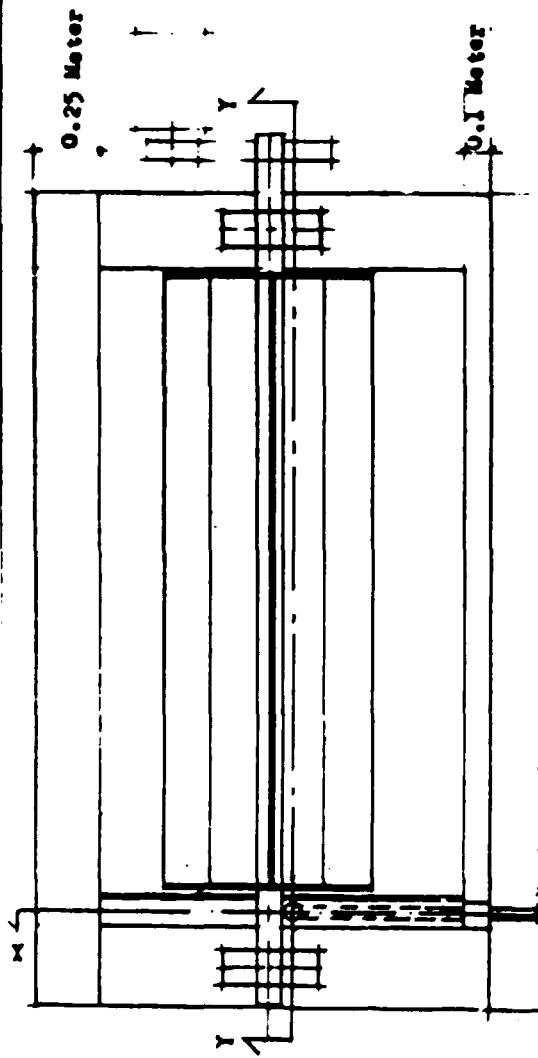
For padding tables hand padding can be used near both machine,

PROCESS FLOW CHART FOR HIDES AND SKINS

A) Liming and Tanning Section

B) Drying-Crust-Finishing Section





PADDLER - HOOD or CEMENT		ANY SIZE
G.I.C		1-1-85
FACTORY DESIGN GROUP I		89016

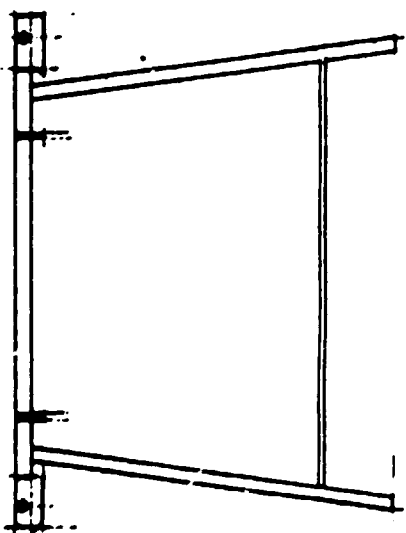
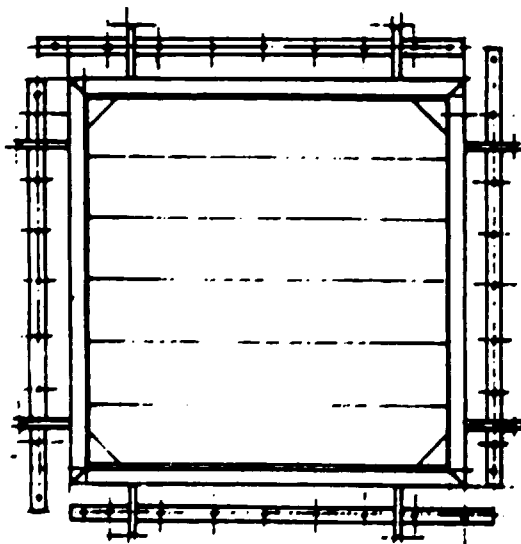
ANNEX 14

C O N T E N T S

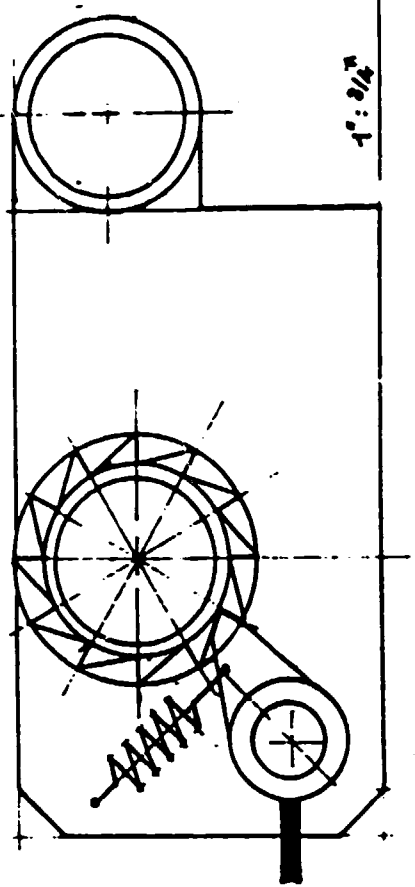
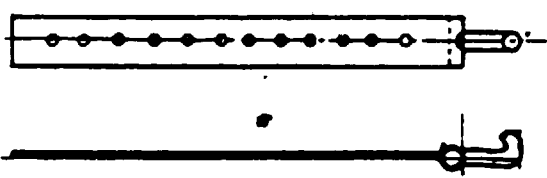
Item

1. Stretching Frames for Football-Leather

(Same frames construction, only different size for waist belt leather)



1/2"



319

1" = 3/4"

FOOTBALL LEATHER STRETCHING FRAME

G.I.C.
FACTORY DESIGN. GROUP - 5

15.12.84

BY
DAS AS SHOWN.

8412